GENESIS I.
AND
MODERN SCIENCE



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GENESIS I.

AND

MODERN SCIENCE

We will, if you please, test this view in the light of facts.—*Prof. Huxley, New York Lectures*

Hast thou appealed unto Cæsar? Unto Cæsar thou shalt go.—*Acts*

BY CHARLES B. WARRING, PH.D.

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The Miracle of To-Day; Genesis and its Critics; Miracle, Law, and Evolution; Geological Climate; etc., etc.

Member New York Academy of Science, Associate Member Philosophical Society of Great Britain, Member Vassar Brothers' Institute

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NEW YORK: HUNT & EATON

CINCINNATI: CRANSTON & STOWE

1892

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TO

ASTRONOMERS AND GEOLOGISTS,

TO WHOM THE WORLD IS INDEBTED FOR ALL THAT IS KNOWN OF THE PRE-HUMAN HISTORY OF OUR GLOBE, AND FOR THE POSSIBILITY OF TESTING THE TRUTH OF THE BIBLE STORY OF CREATION, THIS BOOK IS

Respectfully Dedicated.

IT ASKS ONLY FAIR DEALING, AND THAT ITS OWN MISTAKES SHALL NOT BE CHARGED TO THE ACCOUNT OF WHICH IT TREATS.

C. B. WARRING.

POUGHKEEPSIE, N. Y.,
January 10, 1892.

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GENESIS I. AND MODERN SCIENCE.*

PREFATORY.

With most scientists it is no longer good form to regard the first chapter of Genesis as any thing more than a poem, the work of a wise but uninspired man. High authority advises the "students of science no longer to trouble themselves with these theologies, for their statements are false and their order is wrong."

On this I join issue, and propose, as Professor Huxley says, "to test this view in the light of facts."† As the questions which arise are questions in astronomy, geology, and other departments of natural science, nothing better can be desired than that they should be decided by a jury of experts in these studies. In

A jury of experts desired.

* This paper originally appeared in *The Living Church*. It has been rewritten in part, but not essentially changed.

† "Let all the nations be gathered together, and let the people be assembled: who among them can . . . show us former things? let them bring forth their witnesses, that they may be justified: or let them hear, and say, It is truth."—Isa. xliii, 9.

trials involving commercial law it is desirable to get a jury familiar with its principles. In questions of maritime law experts in that department are sought. In questions of mechanics or engineering men who are to decide them ought to have a knowledge of their principles. With equal justice it is claimed that men acquainted with science are best qualified—I should say ought to be best qualified—to judge of the character of a document purporting to state facts in the antehuman history of our world. The desirableness of such a jury needs, however, a twofold qualification. First, that the "science" which they hold is itself true. The world has seen an amazing amount of "science" which, it is now told, is rubbish; and it very strongly inclines to the belief that much which is held in biology, atomics, and other metaphysico-physics will eventually prove to belong to the same class. And, secondly, they must be so clear-sighted as not to mistake their own ignorance for negative evidence, since there are many matters of which science as yet knows nothing. They must also be so honest as to be willing to give a verdict in accordance with the evidence, even though it overturn some favorite theory or tend to establish the reality of that "impossible" thing, a revelation. One, for example, who advocates the nebular hypothesis and scouts theologians for not accepting it, but declares Moses contradicts science when he says that the earth was once without form and void;

or one who, admitting it to be true elsewhere, that darkness preceded motion and that motion preceded light, denies it in the story of creation, is too much under the influence of prejudice to serve on such a jury. I would set him aside.

It would only be following the example of every court of justice to require the jury to answer simply guilty, or not guilty, or the Scotch verdict of not proven, to each count. Did the judge permit each juror to make a speech instead of uttering a simple yes or no, the matter in dispute would become so involved in a cloud of words that no conclusion would be reached.

A very serious embarrassment meets us at the start. There is no authoritative statement in which are gathered the facts which will be needed. This is greatly to be regretted. Feeling this keenly, I availed myself, a few years ago, of the announcement in the papers that so high an authority, and one so free from suspicion of theological bias as Professor Huxley, was about to deliver a course of lectures in New York on matters pertaining to the early earth-history, and wrote a letter to the *New York Tribune*, from which the following is an extract:

Professor Huxley's New York lectures.

"I am sure that all will join in the wish that Professor Huxley would give an outline of what is known of the antehuman history of the globe. In the nature of the case it should set forth only the most salient

points, and should treat solely of those matters as to which there is no longer any doubt. In other words, it should avoid theories and state facts. It would not be too much to ask the distinguished Professor to clothe his account in simple language, that those not versed in science may understand."

The motive for this request was stated to be a desire to compare the account of creation given by so eminent a scientist with that which Moses has left on record, and which, right or wrong, so many believe to be true.

It is greatly to be regretted that Professor Huxley did not comply with this request. Instead, he repeated the story of creation which is found in *Paradise Lost*, adding, with ill-concealed irony, "I do not for one moment venture to say that this could properly be called the biblical doctrine." And then, referring to conflicts of opinion and changes of exposition among writers on Genesis, he adds a sneering fling at the "marvelous flexibility of the Hebrew"—a fling which comes with peculiarly ill grace from a scientist, for the theories of scientists are ever changing.

The reader will find no difficulty in recalling in-
The "flexibility" of science. stances of the "flexibility" of science. To say nothing of old examples, one of recent date will suffice.

A few years ago it was the fashionable "science"—for "science" has its fashions—to say that

the different races of men could not have descended from one pair. It is easy to recall the arguments so glibly used. "The hair of the Caucasian is specifically different from the wool of the Negro." Then there was "the broad shin-bone, the long heel, and the thick skull." If one ventured to regard these as insufficient he was sneeringly told that no one of any standing as a scientist believed in the unity of the race. It was clear to these gentlemen that the "anonymous author of Genesis" had no "science," and consequently that he blundered grossly when he represented mankind as sprung from one pair. Theologians, as usual, showed their inability to rise above their traditions, and take broader and more reasonable views, and accept the true "scientific" doctrine that the human family was descended from an unknown number of independent pairs. So at least we were told again and again, and all the opponents of revelation said, "Out upon such bigotry and folly!"

But to-day scientists tell the world that "After all, men have originated from a common center," and then a vice-president of the American Association for the Advancement of Science adds the fling, "And now the Church is no better satisfied."* The learned vice-president well knows that the Church is not dis-

* *Proceedings of the American Association for the Advancement of Science*, 1876, p. 145.

satisfied with the conclusion of which he spoke, but with another and widely different one, namely, that men, and brutes, and plants, too, are descended without supernatural help from some one or more original cells which somehow got into existence—a matter of spontaneous development, as if the refuse of a lime-kiln should turn into a Venus de' Medici! It may be that I am blind, but it seems to me far easier, and far more in accord with the experience of mankind, to believe that such changes are the result of intelligent will rather than of law without intelligence or will to enforce it.

This, however, is not the time to discuss evolution. I am a believer in it—for example, a ship from a canoe; farms from prairies; the telescope from the play with spectacles of the Dutch optician's children; and in thousands of other instances.

But I have wandered from Professor Huxley and his lectures. I return merely to say that he ostensibly left Moses and attacked Milton, but with the assumption constantly prominent that he was demolishing the former.

I now renew the request made in the *New York Tribune*—I have made it many times—and ask any scientist of the school of Professor Huxley to give, in his own way and in plain English, the early history of the world. I ask him to place the facts, so far as known, in their true order, and beg him not to wander

away to matters of which Genesis says nothing; since, however important they may be, they would distract the reader's attention and draw him from the question. If such a history should be written all intelligent persons could see in what consist the "gross errors" of Moses. This surely is not too much to ask of those who are constantly lauding "science" at the expense of the Bible. But I fear it will never be done. Is it not time that those who scout this account should do something more than talk about its falsehoods and come to particulars, and show in its own words just what it is that is contradicted by science? It will not do to quote, as did Professor Huxley, what Milton or Father Suarez says Moses said, or intended to say. No court of justice would for one moment accept such evidence when the original documents were at hand.

Dr. Draper's *Conflict between Religion and Science.*

I have looked in vain through Dr. Draper's *History of the Conflict between Religion and Science*, thinking that so able a writer, who had become, as he himself assures us, "accustomed to the comparison of conflicting statements, the adjustment of conflicting claims," would tell his readers plainly what it is in the Mosaic cosmogony which conflicts with science. The indictment which he has drawn does not meet the expectations excited by the title of his book. To be sure, he mentions several matters about which

there have been fierce disputes, as, for example, the length of time since the creation of the earth; the shape of the world, whether flat or spherical; the existence of antipodes; whether animals died before the fall, etc.; but as the Mosaic cosmogony does not say one word about any of them their relevancy is far from apparent.

Although Professor Huxley did not give that outline of the world's history asked for, yet he placed upon record three statements of great importance in this discussion, which the reader will do well to bear carefully in mind. He told his hearers, as the teachings of the most advanced science, that "The world had a beginning;" and that "The physical form of the earth can be traced back to a condition in which its parts were separated as little more than a nebulous cloud, making part of a whole in which we find the sun and the planetary bodies also resolved;" and that "All that is now dry land was once at the bottom of the sea." The interest in these statements does not arise from their novelty, but from their clear enunciation of facts essential to a comprehension of the Mosaic story.

The remainder of Professor Huxley's lectures may or may not have been in harmony with the actual history of our planet; its discussion would be out of place here, since it has little to do with the story in the first chapter of Genesis, the fossils of which he

spoke long antedating the "living" creatures of that account.

In this essay I have been able to speak of only a part of the many interesting subjects more or less directly referred to in the first two chapters of Genesis. A few years ago I put out a volume entitled *The Mosaic Account of Creation, the Miracle of To-day*, in which I discussed many matters not spoken of here. The present is a more extended study of a particular portion of the subjects considered in that book. I have put it in the form of a conversation, because I was thus enabled more easily to bring in the objections which have been made by others, or which have occurred to myself. If the reader thinks the "Professor" offers a weak defense of his side, I agree with him. But I submit that the weakness is inherent in the nature of the case. It must be remembered that, by the rules which we adopted, he was not permitted to indulge in *a priori* disquisitions on the reality of miracles; or on the possibility of a revelation; or as to whether we can know any thing of God; or whether the second chapter of Genesis contradicts the first; or whether Moses wrote the account, or Ezra; or whether there were two writers, an Elohistic and a Jehovistic, or any other matter outside of these two questions: Are the physical statements in the first twenty-seven verses true?

The Professor's weak defense.

and is their order correct? It is surprising how these limitations cause objections to disappear.

Most persons seem to think, when they have devised a scheme by which to obtain the time-space needed by astronomy and geology, that little remains to be done to explain the whole account. This is a great mistake. There are in it many other questions which demand attention, some perhaps even more difficult, as will appear hereafter.

At first it may appear easy enough to get along if we hold the Mosaic story to be an allegory; but on a fair trial such an hypothesis will be found to involve more difficulties than it avoids.

Conclusions as to change of inclination of earth's axis.

If it be objected that certain conclusions in this essay pertaining to the inclination of the earth's axis have not been adopted by scientific men, I beg leave to say that I am well aware of it, but, nevertheless, I believe them to be true. They were in no case made to force a harmony or to eke out an argument, but rest upon facts and reasons which seem impossible to be explained in any other way. The most important of these will be laid before the reader when we come to consider the fourth period.

Whether there has been an increase in the obliquity of the earth's axis since the middle of the pliocene has a very important bearing upon the explanation here offered of the work of the fourth creative stage,

while in no degree affecting other parts of the narrative. And if my proposed exposition should turn out to be erroneous it would merely leave the fourth period among questions which await solution.

This story annals, and not memoirs.

A writer in the *Bibliotheca Sacra*, who favors my *Mosaic Account of Creation* with a notice, repeats, with apparent approval, the remark of a friend who, he assures his readers, is high authority, that I erred in comparing this narrative to the kind of history called annals. In his opinion it should have been memoirs. Why! he missed the most important point in the argument, the most wonderful thing in the story, its correct order! "Memoirs" might do well enough for those who hold that this account will not bear too close examination. But it need shrink from no test, however severe. The accuracy of its order will be found to be the crucial argument that compels belief in its divine origin.

That I have rightly solved all the questions which I have attempted is not to be expected. The Mosaic story of creation has been the problem of the ages. I reverently offer this as a contribution to its solution. If the reader finds a tithe of the pleasure in its perusal which I have found in its preparation he will not regret the time spent upon it. Yet he must not expect to master the matter without study. While a hasty reading may not be without profit, the value of

the return will be in proportion to the time and thought spent upon it, and, I may add, in proportion to the reader's knowledge of physical science. Of no document known to me can it be as truly said that its comprehension, even to the limited extent now possible, is in itself a liberal education as of this much contemned and often unfairly treated first chapter of Genesis. I will also say that there is no other document of equal brevity known to me the successful denial of whose statements, were that possible, would result in consequences so disastrous to science itself. The reader may smile at this as the words of an enthusiast, but I appeal to the evidence which will be produced as we go on.

"I am sick of harmonies and reconciliations."

But says some good Christian brother: "I am sick of harmonies and reconciliations of Genesis and science. They have brought derision on the believers in the Revelation. By ignoring some parts of the account and by placing great stress upon others—by a liberal interpretation of what Moses said by what, in their opinion, Moses meant to say—an agreement with 'science' has again and again been laboriously forced. But scarcely were things 'fixed' before it was discovered that the 'science' to which Genesis had been twisted was, after all, only a theory, and was never intended for any thing more than a convenience to string facts on. It was good enough to attack the Bible with,

but of no value if taken in earnest; in fact, was disproved by some later discovery." He begins to think all science is to be taken in a Pickwickian sense.

Should such a person read these lines I would remind him that if this story be really from God its harmony with the world's history must become more and more manifest as real science advances; and, hence, that a time will come when the two, so far as they treat of the same subjects, will coincide. It is equally true that if men form theories and offer explanations before they have the facts on which to found them their work must show the marks of their ignorance; and it ought not to excite surprise that so many such efforts have proved to be of no value.

Much known of the actual history of the earth.

Whatever may be thought of certain prominent theories of so-called science—mostly pertaining to biology—there is no doubt that vastly more of the world's actual history is known now than, for example, in the days of Milton; and, consequently, we are to that extent in a better position for comprehending the story of creation. On the other hand, if the account in Genesis were of human invention it would easily square with the science of the times in which it was written. But when men acquired larger and more accurate knowledge of the past it would diverge more and more from the current "science," until, at last, the contradiction would become so ap-

parent that no sane man could accept both as true. This has been the fate of all cosmogonies save the Mosaic.

The question, then, is: Has the science of to-day made such progress that we are warranted in accepting any of its conclusions in this direction as absolute verities? Have we any facts? A very brief survey of what has been accomplished will convince the reader that a vast number of facts have been ascertained about which there is no longer any room for dispute. Many of these have become, as it were, a part of the warp and woof of our every-day thought, so that it requires an effort to realize that sensible men ever believed otherwise; as, for example, that there are antipodes, that the earth turns on its axis and revolves about the sun, and that on this and the inclination of the axis the seasons depend. The school-boy of to-day laughs at the wisdom of Herodotus, who tells his readers that the sun goes south every autumn to escape the colds and storms of winter, and returns when they are over.* There are many other facts which have not yet reached all minds, but which are as universally admitted by those who have given attention to such matters. Now, if

* "During the winter the sun is driven out of his usual course by the storms, and removes to the upper part of Libya. When the winter begins to soften, the sun goes back again to his old place in the middle of the heavens."—*Rawlinson's Herodotus.*

we take such accepted facts and compare with them the statements in the first chapter of Genesis it is evident that we may ascertain whether that account and the world's actual history agree so far, providing we neither mistake silence for contradiction nor allow our own notions to modify what Moses says. This is all I propose to do in this book. I submit that results so obtained are worthy of serious consideration.

While writing out the following conversations I endeavored to bring into them all the objections which would be appropriate in the mouth of the Professor; but there is one which has been presented by a reader of my other book on this subject which does not belong to this class. This gentleman, a warm Christian, and of course a believer in revelation, writes me: "I think it is forcing the simplicity of Genesis to interpret it as describing with any sort of scientific accuracy such infinitely complex processes as those involved in the evolution of the present state and relation of matter and force." My friend sets up what he supposes a serious difficulty in the way of accepting my exposition of Genesis, and will doubtless be surprised to know that I agree with him that such an interpretation would be forcing the simplicity of the account. I see in Genesis no attempt to describe the processes of nature. I read that there was light; that an

expanse was made in the midst of the waters; that the waters were gathered into one place, and that the dry land appeared, and that the earth brought forth certain kinds of vegetation; that God made the lights; that the waters brought forth water animals; that the land bore land animals; but not one word do I see as to "the infinitely complex processes involved."

Is literality possible?

A letter before me asks: "In such a document is literality possible? Could the events have been described by man, whoever the communicator, in language that admits of literal interpretation, considering man's imperfect knowledge and powers of apprehension?"

To this I answer: The possibility of a literal communication depends upon what it is which is to be communicated. The Hebrews could not have understood had Moses undertaken to tell how God created the heaven and the earth, and I very much suspect he would have no better success now, though he had Royal Societies and National Academies for his audience. But the single fact that God did create the heaven and the earth the Hebrews could, and, I may add, did, understand as well as the wisest moderns.

The nebular hypothesis would have been incomprehensible then, and is largely so now; but that the earth was once formless and void, a fluid, and envel-

oped in darkness, are statements not difficult to comprehend. The how and the why are as difficult now as then; but of them Moses says nothing.

It may have been impossible for the Hebrews to understand, no matter who the communicator, how the first, or any, plants were made—a matter as difficult to-day as then; but it is easy enough to understand that grass, herbs, and fruit-trees came up at a certain time in obedience to the will of the Creator.

So in regard to animals, literality is easily possible as to all that is here said. Literality presents no impossibility so long as we do not leave the account; and what other kind of literality is conceivable?

All this is equally true of what we call natural phenomena. Nothing is easier to understand than a statement that after a certain number of days of incubation the young bird comes forth from the egg. We may watch the process and note the successive changes; and the more intense our literalism the easier will our description be understood, and the greater be its value as material for the science-mill of the biologist; but the how and the why that underlie it all will be unintelligible, and perhaps will always remain so.

A fact to be remembered.

It is important to remember that the Bible was not given to man to teach him science. Incidentally, as it were, it contains a vast amount of physical truth, but that is a very different

matter. The heavens contain all the truths of astronomy, and the rocks all of geology; but it was very long before there was a science of astronomy, and geology is only of yesterday. The story in Genesis speaks only of those things which all men see, and teaches that God made them. This, it says, was the origin of the heavens above them and the earth and sea beneath, of the transparent expanse above and around them, of sun, moon, and stars, of the vegetation spread out on every side, of the cattle, of wild beasts, of birds, and of the monsters of the sea. As to all else the account is silent. It does not speak of the laws of gravitation, or of light, or of sound. Nor does it speak of intelligences of higher and more ancient order than man, those sons of God who shouted for joy when he laid the foundation of the earth, nor of the long succession of geological horizons with plants and animals preceding and unlike these contemporaneous with man. This principle of contemporaneity with the human race seems almost too evident to need argument. It fits in with every part of the story and brings all into order. The neglect of it by Mr. Gladstone in his *Nineteenth Century* debate with Professor Huxley enabled the latter to win an easy victory.

I cannot help again expressing my regret that Huxley, or Tyndall, or Dr. Draper, or some other authority in physical science among those who have called this story a myth, has not aided us in forming a true

estimate of its character by clearly and distinctly setting forth, in simple language, his own version of the matter, placing each event in its proper order.

Fortunately, we all have access to the results of the labors of those who are eminent in all that pertains to our earth's history, and so can make out for ourselves what will serve our purpose until they shall give us something better.

A chart of the world's history.

As an appropriate prelude to the discussion of the Mosaic account, a chart of the world's history has been prepared for the benefit of those who may not have time or opportunity to study up for themselves.

It divides naturally into two parts. The first includes the immeasurable period between the "beginning" and the time when our earth reached the non-luminous condition. In this long interval the solar system was formed. Toward the end of it the sun shone as brightly as now, and the earth and other planets revolved around it and on their axes essentially as at present. During that period the earth was intensely hot, like the sun, and consequently self-luminous. In this part of the chart the reader will find set down in chronological order certain great facts pertaining to what may be styled the embryonic period, when the earth was in progress from primordial, shapeless matter, to the present rounded, non-luminous planet.

The remainder of the chart includes the time from

the end of the first period to the creation of man. It begins with the first day on our planet—not the first revolution on its axis, but the first alternation of light and darkness, or, as we say, day and night. In the earliest part of this immense stretch of time there was a long period of which geology knows but little. There were boiling waters and dense clouds excluding the sun. There was no life, vegetable or animal. It was a true azoic age, and forms part of what geologists have styled "archæan time."

In the first column on the left of the chart are the Mosaic periods. In the second column are the names of geological divisions, themselves divided into four great groups called Archæan, Paleozoic, Mesozoic, and Cenozoic times. In the third column is set forth the gradual emergence of the land from the universal ocean to present continents. In the fourth are shown the stages of production, or development, of the vegetable kingdom. The fifth column sets forth the progress of animal life from the protozoa to man. In the sixth is given the climate of the geological periods.

The figures in parentheses refer to pages in *Dana's Manual of Geology*, edition of 1880, to which the reader will do well to refer. Indeed, I can hardly speak too strongly of the importance of his getting that work and turning to the references and reading up for himself. At the least, if he would get much

PART I, OR THE EMBRYONIC STAGE. (Th

OF the origin of matter science knows nothing. It can only say, with Genesis 1: "In the begi
diffused, and, until in motion, wholly in darkness. The earth itself was then unformed and
motion science is wholly ignorant, and can only attribute it to the same source as matter. At t
astronomy, aided by spectroscopy. After motion came heat and light; the latter being feeble,
trum, three narrow bands. With the impartation of motion the solar system began to form,
intense heat. The next step was the change from a vapor to a liquid, and then the hitherto p
probable that the planets were all formed, and revolving about the sun. Further cooling cause
light. Henceforth our globe was dependent on the sun for illumination, and then for the first
is to be reckoned the beginning of present conditions. For all that is known from this point on

PART II, OR TRUE

	GEOLOG'L DIVIS'NS.		LAND AND WATER.	VEGETA
SECOND MOSAIC PERIOD.		AZOIC TIME.	(1) Water only as separate gases. (2) Water as steam or vapor.	Non
		ARCHÆAN TIME.	The water deposited, and the land all covered by it. Later on, a few spots here and there began to appear. (160.)	Vegetation here be kinds, reaching nothi flowerless, seedless, s ureless sea-weeds. (1
THIRD MOSAIC PERIOD.	PALEOZOIC TIME.	Lower Silurian Age.	During this age the land continued to emerge, but its extent was small.	More species of sea- plants. (169.)
		Upper Silurian Age.	In the Upper Silurian the emergence continued, but was still quite limited.	Now were added th seedless and floweries
		Devonian Age.	Land still emerging, but not very extensive. At its close in the present United States, for example, the New England States, Middle, and Western, north of the Ohio, with a few spots in other places, were all that were above water. (292.)	To the previous vege many new species. A plants whose seeds w fruit. All were eithe gymno-sperms. (288.
		Carboniferous Age.	The emerging continues; and by the close of this age, in the United States, besides the above, about as much more south and west was left bare. (292.)	To all the above we cycads, trees interme nifers and the yet fu was the age of coal. (
			☞ "At the close of the Carboniferous Age there was an ext	
	MESOZOIC TIME.	Triassic Period.	Emergence continues, but was not extensive in the United States, including east of longitude 30 degrees only a few thousand square miles for this period and the next combined. The development was much greater in Europe.	Plants as before, bu New kinds of tree-f conifers, mainly cdm No grasses nor mosses
		Jurassic Period.	The development in this period, also, was much greater in Europe than in North America.	Plants of same type all plants thus far wer that is, spore-bearing- —that is, gymno-sper fruit-trees to the end
		Cretaceous Period.	Large additions to the land in both hemispheres.	In addition to the s naked-seeded plants a first time palms and a bearing fruit whose se
			☞ At the close of this period there was a destruction	
SIXTH PERIOD. FIFTH PER'D. FOURTH PER'D.	CENOZOIC TIME. Tertiary Period.	Eocene Period.	A considerable increase in extent of the dry land.	All angiosperms an become dominant.
		Miocene Period.	A further enlargement.	An increase in the s in the Eocene.
		Pliocene Period.	In this period the dry land was completed, having before its close the same coasts, mountains, and plains as at present.	Angiosperms and pa the dominant vegetati era were established.
	Quaternary Period.	Glacial Period.	A time of high latitude movements of the earth's crust. A very large portion was covered with ice.	Present plants lived od of ice (Saporta, *Le* p. 380).
		Champlain Period.	Land depressed, especially in high latitudes.	Plants continue uncl
		Reindeer Period.	Land, in part, elevated above the present.	Plants continue uncl
		Human Period.	Land about as in the Pliocene period.	Plants continue uncl

Speaking of the period just after the glaciers, Professor Nicholson, in his *Ancient Life His*
is, all are living species. At the close of each period there seems to have been a very considerat
seems to have been much mo[illegible] complete. The position of man is in dispute. Some place his first a

N. B.—The numbers abo[illegible] thi

STORY AS MADE KNOWN BY ASTRONOMY AND GEOLOGY.

(This includes the whole of the First Mosaic Period.)

beginning God created the heavens and the earth." At first matter was infinitely attennated, uniformly and void. The first step toward present conditions was the impartation of motion. Of the origin of At this epoch the nebular part of the world's history begins. Henceforth it comes within the domain of ble, as shown by present nebulæ. It had in its spectrum, in place of the broad colors of the solar spec- m. Ring after ring and planet after planet were formed, each, at first, a mass of vapor, glowing with to poor light became like that of the sun, rich in color and good for its present uses. By this time it le ased a black opaque crust to form on the molten matter of the earth, and thus prevented the emission of rst time was possible that alternation which we call day and night. This was the first day, and from it t onward to man we are indebted to geology.

DUE PLANETARY STAGE.

STATION.	ANIMALS.	CLIMATE.
None.	None.	Surface temperature below red heat.
e begins in the lowest othing higher than the ss, and almost struct- . (157.)	Here life began; there was in this age nothing higher than the minute protozoans. (158.)	The climate was hot every-where, even to the poles, while the atmosphere was poisonous with carbonic acid and other injurious gases.
sea-weeds, but no land	Besides the above, radiates, mollusks, and articulates are now met with. (169.)	Temperature tropical every-where. (209.)
d the first land plants, eriss. (242.)	To these are now added the first fishes. They all were cartilaginous. (252.)	Temperature slowly falling, but still tropical. (253.)
vegetation were added s, as yet there were no ds were inclosed in the either spore-bearing or (283.)	The kinds of animals were increased by many new species of fishes. These were so numerous that this is often called the Age of Fishes. (288.) First insects known. (273.)	Temperature still slowly falling, but climate very warm to the poles. No evidence of seasons. (288.)
ere were now added the rmediate between co- ut ture palms. This al. (349.)	To the previous types were now added reptiles. (349.)	Temperature falling, but still warm and about the same in all latitudes. (352.)
a determination of life, one of the most universal in geological history." (430.)		
en, but of new species, nsferns, cycads, and y composed the forests. sses. (408.)	The same types of animals, but in new species, continue. To them were now added the first mammals. These were few in numbers and belonged to the Marsupalia, or Pouched animals. (415.) In this period the first birds are found.	There now begin to be indications of a difference between temperature of high and low latitudes, but still quite warm in the former. No evidence of long polar days and nights.
types as before. Note: y were either seedless— ferns—or naked-seeded ngiosperms. No grasses or end of this period.	To this period the first osseous, or bony, fishes appeared. (442.) The most remarkable creatures were great reptiles with wings, and birds with long bony tails.	Temperature apparently about the same. (452.) No evidence as yet of present inequality between equatorial and polar days.
the spore-bearing and ns are now seen for the and angiosperms—trees osed is inside. (458.)	Reptiles in greatest abondance and of enormous size. Birds with teeth. (466.) No marked advance.	Climate warm to latitude 60 degrees and upward. (380.) No evidence yet of seasons.
ation of species "remarkable for thoroughness and universality." (488.)		
and palms began to d.	All were of new species, although in many cases the genera were the same. Mammals were numerous, especially herbivorous and carnivorous. Here seem to have been the first monkeys. (589.)	Temperature warm enough for cypresses and magnolias in Spitzbergen. (514.) No evidence thus far of present polar nights and days.
n the same direction as	Many new species, but of same general character.	Fall of temperature. (514.) Zones of climate; no evidence of long polar nights.
and palms at last became getation. Present gen- ished	Many new species, but no very great change. All its mammals are now extinct. (Nicholson, *Life History*, 326.)	A comparatively rapid change of temperature, reaching, at last, great cold in high latitudes.
ssed through this peri- (in *Monde des Plantes*,	General destruction of higher animals. Some migrated toward equator. "Of fishes, birds, reptiles, and mammals of the Pliocene not one is now extant." (518.)	Temperature cold. Ice-cold down to Virginia.
e changed.	The fishes, reptiles, and fowl were of living species; also the invertebrates. Page 345 of Nicholson, *Life History*. (543.)	Climate milder than now, and long arctic days and nights.
e unchanged.	The fishes, reptiles, and fowl were of living species, also the invertebrates. Page 345 of Nicholson, *Life History*. (543.)	Climate colder. Days and nights as now.
unchanged.	Living mammals, including many new species and man.	Present climate. From the glaciers there is evidence of seasons.

History, p. 345, says: "No extinct species of fishes, amphibians, or reptiles are known to occur"—that erable destruction of life; but at the end of the Carboniferous, Cretaceous, and Pliocene the destruction irst app l, and a few even much farther back. st three were longer than the others.

good from these pages, he *must* familiarize himself with the names of the geological divisions mentioned, and, above all, fix clearly in his mind the place of the cretaceous, the three divisions of the tertiary—the eocene, miocene, and pliocene—and the quaternary, including the glacial epoch, the Champlain, and the recent.

THE PROFESSOR.

BEFORE entering upon the discussion recorded in these pages it will be in order to say a few words about the one who takes the role of opposer, and who is called the Professor.

Before our acquaintance he spent a part of the summer at the house of an old classmate of mine, who described him as follows. Afterward I found the description sufficiently accurate.

"The Professor," said my friend, "has little faith in any thing but physical phenomena and the laws deduced from them. He does not believe either in miracles or revelation. He considers them impossibilities, or, as he would sometimes say, 'things incapable of proof, and, therefore, a waste of power on the part of the Almighty, even if they did really occur.' His ability to conceive, he says, marks the limits of his belief; consequently he denies the existence of a personal God.

"He is an admirer of Mr. Spencer, and of others of the same way of thinking. In his opinion they are the great lights that are to enlighten the world. He

gives to their philosophy the faith which he refuses to the Bible. With Buckle, he believes that, upon the whole, religion has been an obstacle in the way of human progress. He is fond of saying that there has always been a conflict between religion and science, and that religion has always been in the wrong. When doubt as to this is expressed, he at once cites the Mosaic account of creation, and declares as a matter not to be questioned by any one whose opinion is entitled to respect that it is irreconcilable with, and, indeed, flatly contradicted by, the superior knowledge of the present day."

Some weeks after this letter was received the Professor came into our neighborhood, and it was not long before we met. As our studies and tastes were similar we had no lack of topics of mutual interest, and we spent many pleasant hours in discussing them. For some time I saw little to indicate the aggressive belief of which my friend had written me; but one evening, as we were sitting in my library conversing about the wonderful progress which geology and astronomy, and, indeed, all departments of physical science, had made during the last half century, he began to speak about the need of more completely throwing off the shackles of old superstitions, and of the debt which mankind owed to science for its assistance in this great work, and especially for having so clearly proved the falsity of the fable called the

Mosaic account of creation, adding, "False in one, false in all."

There was in his manner something of that offensive air of superior wisdom which Buckle, Spencer, Huxley, and others so often assume toward those who believe in the Bible. It touched me for a moment, until I reflected that it belonged not to the man but to his school. I had my doubts, too, whether he knew so much about that chapter as his positive way of speaking seemed to indicate. So I smothered a little natural feeling and asked if he had ever read it. He replied, "Every body knows what Moses says; but I do not depend upon my own reading in this matter as much as upon the account given of it by those who profess to be its special friends and expounders. Their theories and explanations I have read, and to some extent, studied. They have given it so much thought and labor that I am sure they have made it as plausible and as consistent with nature as possible. But I find what they say so contrary to what I know to be true—their explanations so absurd, and the whole matter so false—that, as a scientific man, I cannot believe the story itself, nor the book which pretends to authenticate the story. Its claim to be from an all-wise and truth-loving God is simply absurd."

To this I answered that I was as unable as himself to accept a falsehood as a revelation from God, but

that for my own part I did not look upon this chapter as a falsehood; that this question of truthfulness was one of great importance; that although at first it might appear fair and even generous to accept as its true meaning the theories and explanations of its friends, yet such a course might lead to erroneous results, since they were not authorized to speak for Moses, and it was quite possible that they were so limited in their knowledge, or so filled with false science, that however good their intentions they could not comprehend the truth, no matter how clearly it was stated. If it should turn out that they have attributed to Moses any thing not belonging to him, common justice requires that he should not be held responsible. And, furthermore, since the Hebrew is the only authority, if there is apparent error the narrative is not to be condemned on that account unless, on a fair examination, it shall appear that the translation correctly represents the original. I, for one, did not believe in any conflict between Genesis and truth, however it might be as to "science." Indeed, as "science" has always been very incomplete, and more or less mixed with error, it was to me no small presumptive evidence of the divine origin of the Mosaic cosmogony that no one had been able to make it square with past "science."

It is only within the life of the present generation, I added, that science has reached a position suffi-

ciently advanced to enable us to see the agreement between the story and the actual history of our world. In short, the science of to-day has barely attained some of those heights of knowledge which, for thousands of years, have been held by this account.

My words, I knew, sounded to him extravagant, but I spoke with a full sense of their meaning, and, if he was willing, I would gladly go with him through this chapter and compare its statements with facts as they have been made known by astronomers, geologists, and others.

The Professor shook his head incredulously, but after a little consented to make the experiment.

The limits of our discussion, and the rules of exegesis which we agreed to adopt.

I suggested that it would be well to lay down certain rules for our guidance, that our conversation might not be led off into collateral matters. He probably had his opinion as to whether Moses wrote this account. I saw no good reason for reversing the voice of antiquity; but this was not the question we proposed to consider, as it had no bearing on the truth of the story itself. Therefore we would not discuss the authorship, but start with the self-evident fact that the account exists now, and has existed for several thousand years. For convenience, but not as adopting any theory, we might speak of it as the Mosaic account and of Moses as the author.

As rules to govern us in our investigation I thought the following no more than fair:

Words are to be taken in their usual sense, and the story allowed to mean just what it says.

It is not to be held responsible for what any one has inferred that Moses intended to teach.

Last, but not least, silence is not denial.

To all this the Professor readily agreed.

I then added that for the present, at least, our discussion should not include any other part of the Bible, for certainly the difficulties, or errors, as he might esteem them, which Colenso and others think they have discovered elsewhere have no bearing upon the first chapter of Genesis.

At first he demurred, saying that these things had weight with him if not with me, and he thought we were in no condition to pronounce an opinion upon the Bible if we left all the rest out.

I reminded him that our object now was not to decide upon the truth of the Bible, but only of the first chapter. This was written long before the rest of the book, and was true or false independently of it. Our only business at present was to determine whether it was veritable history or a myth. Afterward, if he chose, other matters could be considered. Moreover, I proposed, if he were willing, to confine the discussion to the first twenty-seven verses of the chapter. I desired this limitation be-

cause it was impossible for tradition to give Moses any account of things which occurred before man appeared, and these verses were concerned wholly with such events.

Some who have discussed this story, and arrived at conclusions unfavorable to its truthfulness, have based their results upon what seemed to them contradictions between the first and second chapters. Others claim that it was taken from the Chaldeans. Both these questions, however important in themselves, are of no consequence so far as the line of investigation which I proposed to follow is concerned. The first chapter of Genesis is true or false, without reference to the second; and if I admit (which I do not) that somebody got the story from the Chaldeans and foisted it into the Bible, whatever other effect such an admission may have it has none upon our question. The statements here are true or false, no matter where they came from.

The Professor had no objection to these limitations. Certainly the statements in the first chapter are true or false whether they are contradicted by those in the second or not, or whether they came from the Chaldeans. He was willing to go into the matter as thoroughly as possible, although, to be frank, he thought it rather a waste of time.

I then called his attention to Dr. Draper's views as to what a revelation should do, and read the following

from his *Intellectual Development of Europe*, and asked what he thought of it:

"Considering the asserted origin of this book,* indirectly from God himself, we might justly expect that it would bear to be tried by any standard that man can apply, and vindicate its truth and excellence in the ordeal of human criticism. . . . As years pass on and human science becomes more exact, more comprehensive, its conclusions must be found in unison therewith. When occasion arises it should furnish us at least the foreshadowing of the great truths discovered by astronomy and geology, not offering for them the wild fictions of earlier ages, the inventions of the infancy of man."

What a revelation would do.

The Professor thought this a severe test, but he saw no reason why he should object. It seemed to him incredible that God, the Creator, the embodiment of all knowledge, should, if he spoke at all of the creation, do otherwise than state facts, nor could he conceive of any end to be gained by giving them in any other than their true order. It would seem most natural to relate things one after another just as they occurred, and the true order would present no greater difficulty to the minds of the Hebrews than

* Dr. Draper is speaking of the Koran, but his words are better than he knew, and I adopt them as a fair test of the Mosaic story of creation.

any other. Such a series of statements would necessarily foreshadow discoveries which the future was to make, and which, it is highly probable, are not all made yet. The lack of such foreshadowing would, as Dr. Draper intimates, be indicative of another origin—one that was not divine.

As this accorded with my own views I made no reply.

We then agreed to meet the next evening in my library, and so it was our discussion began.

OUR FIRST EVENING.

THE THEME.

Genesis i, 1–5.*

1 *In the beginning God created the heaven and the earth.*
2 *And the earth was without form, and void;*
And darkness was upon the face of the deep.
And the Spirit of God moved upon the face of the waters.
3 *And God said, Let there be light: and there was light.*
4 *And God saw the light, that it was good:*
And God divided the light from the darkness.
5 *And God called the light Day, and the darkness he called Night.*
And the evening and the morning were the first day.

THE Professor was promptly on hand. I had prepared for the occasion by laying on my table certain books which I thought would be needed. Among them, and most important, were a Hebrew Bible, Lexicon, and Concordance; a copy of the Septuagint and our English Bible; Dana's *Manual of Geology*, and Herschel's *Outlines of Astronomy*, and quite a number of other books on geology, spectroscopy, etc. As he took his seat he glanced over the table and said, "This looks like business; but I do not see any commentaries on the Bible."†

* The Common Version, except as to divisions into paragraphs. In the course of these discussions will be found such criticisms on the common rendering as I may have to offer.

† I had examined a number of commentaries, but found little in them for our present purpose, and, therefore, did not lay them on my table.

I replied that perhaps they were more essential to his arguments than to mine; that all that I was concerned with was the words of Moses himself, and those I proposed to take in their simplest and most literal meaning. Others had told us what Moses meant to say; my purpose was to let him tell his own story in his own way.

The Professor thought that seemed fair enough.

I then took up the Bible and read: "In the beginning God created the heaven and the earth," and asked whether that were true.

A beginning.

He replied, "Undoubtedly there was a beginning of the present order of things,* and the universe must have originated in an Ultimate Cause—that is, in the will of God. Many persons, however, do not believe in a personal God. They would say, 'In the beginning the ultimate

* "All modern science seems to point to the finite duration of our system in its present form."—Professor Newcomb, *Popular Astronomy*, p. 489.

Professor Tait, in his *Recent Advances in Physical Science*, p. 22, says: "It (the principle of the Dissipation of Energy) enables us distinctly to say that the present order of things has not been evolved through infinite past time by the agency of laws now at work, but must have had a distinctive beginning, a state beyond which we are totally unable to penetrate; a state, in fact, which must have been produced by other than the now visibly acting causes."

And again, on page 26, "All portions of science, and especially that beautiful one, the Dissipation of Energy, point unanimously to a beginning."

The philosophy which, to avoid this conclusion, talks about a straight line returning upon itself, and of space which has four or more dimensions, is worthy of those agnostic scientists who talk of worlds where two and two may make five.

cause produced the heavens and the earth.' They would object to this expression, 'The will of God.'" *

I replied that for my part I had no objection to his styling the Author of all things the Ultimate Cause, or the First Cause. I was a believer in a personal God, but whether on good grounds or not was outside of our discussion, since that question had no bearing upon the truth or falsehood of the physical statements in these twenty-seven verses. They commence their account at the "beginning," and you admit that there was a beginning; our next business, therefore, is to inquire what was the condition of the earth at the earliest period at which philosophy takes cognizance of it.

The earth's primordial condition.

Laying his hand upon the astronomy lying before him, and turning over its leaves, he answered, "Laplace improved and gave anew to the world the theory which commonly goes by his name, and, as far as I can see, it gives a true description of our world's original condition.†

"According to that great astronomer and mathematician the solar system existed at that time only as a mass of infinitely attenuated matter, something like gas or vapor. The earth then was an integral part of that immense nebulous body, and consequently had

* Some say, an unconscious intelligence (!) produced all things.

† "Original," so far as philosophy can tell us. It is the point at which the mind stops when tracing back the chain of causes and leaps to the infinite.

no more form or shape than has, for example, a ton of water in the clouds which darken the sky before a rain. The clouds have shape and form, however irregular, but any one ton among the thousands which they contain has none.

"It is easy," he continued, "to see in this the superiority of science over Genesis, for, according to all the commentators who have not been shamed out of it by scientists, Moses says the world was called at once into being, a vast, solid globe, incomparably larger than the sun and stars. Here is one of those contradictions—an important one, too—which compel scientists to refuse to believe this story.

Three errors in Genesis.

"In fact, here are three errors. He says, or at least implies, that the world was called suddenly into existence. This is an error, for the world was millions of years in making. He regards it as solid from the start. We know that it was once gaseous, then molten, and not solid till long after. His third error is as to size. The earth is not larger than the sun and the stars."

Stop a moment, I replied. Where does Moses say "the world was called at once into existence a solid globe?" Where, too, does he say that "it is larger than the sun and stars?" I handed him the Bible; he ran his eye up and down the page, and then said: "I do not see it in so many words, but certainly it must be implied, and Moses himself must have

thought so, or else so many commentators would not have given out that idea to the world."

I reminded him that Moses was responsible only for his own words, and certainly his account should not be pronounced false for what is not in it.

I added that I, too, believed that our earth was once a gas and then molten. It was worth noting that it would not be easy even now, with all our knowledge and with the help of a copious scientific terminology, to describe the earth's condition while yet an unsegregated part of a vast nebulous mass, in more fitting terms than those which Moses has used, and which are rendered in our version "without form and void." These words are *tohu* and *bohu*. *Tohu* occurs twenty times in the Bible. It is rendered *vanity* in the phrase, "less than nothing and *vanity;*" and in "he maketh the judges of the earth as *vanity;*" and, "they that make a graven image are all of them *vanity;*" and, "they trust in *vanity*." "Ye go after *vain* things." "I have spent my strength for *naught*," etc. What more accurately descriptive word can be found for matter ten thousand times less dense than air?

Meaning of "tohu" and "bohu."

Bohu occurs but three times, and is rendered in each place by *void*, or its equivalent, *emptiness*.

It is perhaps not easy to gather into one word the meaning that runs through and connects all the meanings of *tohu;* in connection with *bohu* it is

exquisitely applicable to the infinitely attenuated,* nebulous matter, impalpable, invisible, amorphous, void even of cosmic organization, the unshaped raw material of future sun and planets. Whether we thus derive a version for ourselves, or whether we accept the less literal English, "without form and void," matters little for my argument; but where would Laplace's nebular hypothesis, and the cosmic theories of our agnostic friends based thereon—where would these be if our earth never was in the condition described by these words? Would not the successful denial of that one clause annihilate them all?

The denial of the once "tohu, bohu" condition fatal to the nebular hypothesis.

The Professor hesitated a moment, and then frankly said: "Every believer in any form of the nebular hypothesis must admit that this clause, somehow, does describe a condition which once existed. If Moses really meant what his words now seem to say, that sentence is true. But he meant no such thing, and had no idea that such a meaning would be attached to them. He thought that some six thousand years ago or so

Objection 4.

* If the matter now in the solar system formed at that time a sphere extending only to Neptune it must have been four hundred million times rarer than air at the earth's surface now—about as near nothing as the human mind can conceive!

It must be remembered that the essence of the nebular hypothesis is that the earth and all the solar system were in a gaseous condition. As to how they got into the present arrangement opinions differ. It is only the once gaseous state that we are here concerned with.

the earth was in a condition fitly described by *tohu* and *bohu*. We know it was not in such a condition six thousand years ago, nor ever, except millions of years ago, while it was part of a nebulous mass—something of which he had not the slightest knowledge, and therefore he could not have referred to it. Hence he really erred, although his words chance to describe a condition that did once exist."

To this I replied: We need not argue about that. I am willing to admit that Moses, like many others of the prophets, did not fully comprehend the meaning of his utterances;* very probably he had many erroneous notions. This is not at all the question which we are considering. Here, in this chapter, are certain physical statements, however they came; and, whatever Moses or the Hebrews may have thought about them, I propose to inquire whether they happen, if you prefer that word, to describe real conditions or transactions, and let other matters take care of themselves.

The Professor admitted the justice of this, but said he had been so accustomed to the other view that he found it difficult to rid himself of it.

I suggested that hereafter he should say of a statement that it was true or false, and not qualify his words with conjectures as to whether Moses meant what he said.

*1 Pet. i, 10.

To this he assented.* After a moment's pause, he added: "Are you not assuming that the condition spoken of as 'without form and void' was almost infinitely remote, instead of being, as the account in my opinion clearly intimates, only six common days before Adam? and this, too, contrary to the voice of all antiquity? Is not this tampering with the account?"

Objection 5. It says the world was made only six days before Adam.

I replied that I assumed nothing as to the time, but had simply asked whether the words "without form and void" did not correctly describe the nebulous condition; and whether, if the earth never was without form and void, it could ever have been part of a nebulous mass.

If he closely examined the account he would see it was he that put into it an unauthorized statement when he said that Moses teaches that the formless and void condition preceded the creation of Adam only six days. It is true that Moses speaks of six days, but he does not say (1) that this condition immediately preceded the first day, nor (2) that the days followed each other in immediate succession, nor (3) that they were common days. Whether these

* Although the Professor agreed not to make use of that objectionable expression, yet, as the reader will see as the conversation continues, he was unable to keep his promise. In truth, the assertion that Moses does not mean what he says lies at the bottom of so many explanations on the one side, and so many objections on the other, that taking it away destroys almost the whole of them.

propositions are true the account does not say. They are open questions, to be determined from the study of all the facts involved.

The Professor made no reply except that this was a new way to study Genesis, although he must admit it was common enough in every branch of science. In short, it was letting theories wait upon facts, and to that, as a scientific man, he had no objection.

I continued: The account thus far being admitted to describe actual conditions, we will pass to the next sentence. Moses says, "And darkness was upon the face of the deep," * and not till after that does he speak of the imparting of motion. Tell me if this order be not scientifically correct—darkness before motion.

* The deep: *tehohm.* This word carries with it a sense of profound depth and mystery. It is applied to the sea, but with reference to its depth rather than its nature as water. The sense of mystery is always an element more or less prominent. Job xxviii, 14: "The deep (depth) saith, It is not in me; and the sea saith, It is not in me." Here it is not the sea, but is contrasted with the sea. "Ye dragons, and all *deeps* " (*depths*), Psa. cxlviii, 7; and again in Deut. xxxiii, 13: "Blessed of the Lord be his land, for the precious things of heaven, for the dew, and for the *deep* that coucheth beneath." "The Almighty shall bless with the blessings of heaven above, blessings of the *deep* that lieth under" (Gen. xlix, 25). It is a strange and mysterious depth, whether of the earth or of the sea. The Septuagint sought to express this double meaning by "abyss," and to some extent it is found in our word "the deep." If applicable to the ocean, how much more to such a deep as that nebulous matter yet inert nd dark, a deep whose profundity the mind is powerless to measure, although we may express it in figures? Its depth, as astronomy tells us, was greater, by some unknown amount, than the radius of Neptune's orbit. It was more than twenty-eight hundred millions of miles.

"Certainly," he replied; "light is well known to be a mode, or perhaps more properly a result, of motion, and before motion there could have been no light whatever, but only darkness. I have been told, however, that the darkness of which Moses wrote was something quite different, not a mere absence of light, but itself a positive entity; that certainly is absurd." *

Objection 6. "Darkness is a substance."

I agreed that such a statement would be absurd, but as Moses did not make it, and was in no degree responsible for what people said about him, I did not see the relevance of the remark. He put upon record what he had to say, and it was unjust to charge him with error because pseudo-scientists, many centuries after his death, tacked these falsehoods to his words. Here, then, I added, is one verse which does somehow "chance" (?) to describe conditions which once really existed, and to place them in their true order.

* Lange talks about "Latent light=material darkness." See his *Commentary on Genesis*, p. 188.

It may be thought useless to refer to the absurd things which expositors have said in the name of what they call "Science." But it is these that have made the creative story an offense to all who have even a smattering of true science, and have driven away multitudes of thinking men, or compelled them, with Mr. Roreson, to believe that God inspired Moses to write what seems a history of the creation, but which was never intended to be such, but is only a hymn setting forth in poetical language God's creatorship.

Those who would see what absurdities—stones in place of bread—are offered the biblical student, will find an astonishing illustration in Lange's *Genesis*, pp. 188, 189, and beyond. No quotation can do justice to the "science" there displayed!

He replied: "If what Moses says is to be taken literally I cannot object; but, then, nobody thinks of his meaning exactly what he says. Undoubtedly this verse is a poetical description of something in his imagination, and it merely happens to describe conditions which really existed."

Well, Professor, I said, if these prove to be the only coincidences possibly your explanation may be right. We will see. At present we will go on with the account. How do you account for motion?

"I cannot account for it," he answered. "I can only attribute it to the First Cause that, as Moses says, created the heaven and the earth; and as I see he does the same I am content to admit he is right." *

"But Moses says this 'moving' was upon the face of the *waters*. There were no *waters* when the earth was in a nebulous condition, consequently he could not have referred to that state, and if so your explanation fails."

Objection 7. No waters when the earth was in nebulous state.

I have more than once, I replied, found what

* It is curious to note that the particular kind of motion with which science specially occupies itself, and to which are attributed most of the processes of nature, is specifically described by the word here used to denote the divine act. It is a throbbing, pulsative motion; or, in more scientific phrase, an undulating movement. It is used elsewhere but twice: "All my bones shake" (Jer. xxiii, 9); "As an eagle fluttereth over her young" (Deut. xxxii, 11). Dr. Tayler Lewis says that the verb, being here in the Piel, only intensifies this idea.

seemed to me an error; but the apparent contradiction disappeared when I turned from what people say Moses said to his own words, and took them in their most radical, and consequently their most ancient, meaning. The Hebrew possesses a descriptive power which modern languages have lost, or, perhaps it would be better to say, never had. In the infancy of the race things were named from some real or apparent quality. This mode of naming is still found in chemistry and in other departments of science; but instead of taking words from our own tongue we borrow from Greece and Rome. Thus we have oxygen, *the acid-maker;* hydrogen, *the water-maker;* fluid, *that which flows*, the opposite of solid. This last term, fluid, we apply indifferently to water, air, the ether, and to all non-solids. Now, you know, or can easily learn from the lexicon, that this word rendered waters, *mahyim*, is the exact equivalent of our word *fluid*, for it also comes from a root signifying, according to Gesenius, 'to be fluid, to flow.' *

Meaning of *mahyim.*

Rendering the Hebrew, then, with the strictest possible adherence to its radical sense, we have: "And the Spirit of God moved upon the face of" something (whatever it was) which could flow, and was *mobile, non-solid.*

* *Mahyim* is applied to at least three other fluid substances. See this word in Gesenius, *Lexicon.*

"But," interrupted the Professor, "why did not Moses use some other word to indicate the highly diffused, attenuated, fluid condition of the primordial matter instead of one so likely to mislead as *mahyim*?"

Hebrews had no word for gas, or for air at rest.

Because there is no other word in the Hebrew that so well describes—or describes at all—a gaseous body at rest. It must be remembered that the important obvious characteristics of the primordial matter, before motion had been imparted, were its fluid, ether-like condition and the absence of motion. The Hebrews had no word for air or gas. The nearest approach to it was *ruah;* but that is, through and through, a noun of motion. It is wind or breath, but never air at rest.

I added that there is a great difference between the appositeness of the Hebrew *mahyim* and our modern word "nebulous," as applied to such matter, very much to the advantage of the former. Ours is the word of a child who looks no deeper than the surface, and, because he sees something which looks like a bit of fog or mist in the sky, calls it a nebula, which Webster defines to be a Latin word "signifying mist, vapor, a cloud." *Mahyim* is a name which one would give who knew thoroughly the nature of that of which he spoke, and hence was able to select a word denoting a most important—perhaps its most important—characteristic. In fitness of nomencla-

ture, in this instance at least, modern science lags far behind the author of this story.

I then called his attention to the manner in which Moses describes the primordial condition. It is impalpable, without form, as it were nothingness; that is *tohu*. It contains nothing, is void of land and sea, of plants and animals; that is *bohu*. It is enveloped in darkness—darkness covers it. It is the profound, awe-inspiring, mysterious deep; that is *tehohm*. It is at rest, but not a solid, it is mobile, a fluid; that is *mahyim*, on which the *Ruah Elohim*—the Spirit of God—was about to move. I asked if, with all the wealth of our English tongue and its unlimited right to draw upon the languages of Greece and Rome, he could do better.

"On the face of the waters."

To this the Professor made no reply, but, evading my question, said: "Moses says 'upon the face of the waters,' or, to use the meaning nearest to its radical signification, 'upon the face of the fluid mass.' Now, 'on the face' cannot, so far as I can see, mean any thing else than 'upon the outer surface.' How do you explain that?"*

* The Professor being a firm believer in the nebular hypothesis, we did not speak of certain matters which will suggest themselves to the reader. Scientific men are not agreed as to the mode in which our system was produced from the gas-like matter. Some think that the rotary motion began at the center; others that it arose from the center-ward movement of the atoms, and that the planets were not thrown off, but were left behind in the form of rings as the inner parts shrank toward the grand center; others, again, say that while in

I am not able to explain the mystery of the beginning of force and motion. All that I dare attempt is to take the facts of our world's history as science has made them known, and compare them with what I find here in the story itself. This I may do without irreverence or presumption. Perhaps, however, the little that is known may cast some light even on that phrase. If we go back into the past to the period preceding the segregation of the nebulæ we find matter infinitely diffused, and in a state of rest or equilibrium. That there was a time antecedent to existing motions is evident, because these all tend to use up the present store of force, or at least to turn it into heat, and to transfer that to the ether. A loss, however small, going on from all eternity would have exhausted the *vis viva* of the universe countless ages ago. It is difficult to conceive of matter at rest except it be uniformly diffused through space. Then the mutual attractions would neutralize each other.

Or it may be that, at first, matter existed without attraction between its atoms, and then it would have

one of these ways, or in some way not yet thought of, the planets were formed from diffused nebulous matter at some inconceivably remote period, they were afterward largely added to by accretions of meteoric matter. All, however, are agreed that our globe was once molten, and they are almost, if not quite, as unanimous that it was once in a gaseous condition. Whichever of these theories is true, its central fact, the gas-like state of the earth, is well described by the language of Moses.

no tendency to move. The ether seems now to be in that condition. It possesses elasticity and inertia, but not gravitation. Such a condition of equilibrium or rest would never come to an end of itself, much less generate a solar system. There was needed some external disturbing force to give the first impulse. Of this science gives no explanation, but is forced to be content to refer it to the first cause. Moses does the same. It was, he says, the Spirit of God that moved upon the face of the fluid substance—that is, from without. It may be, too, that the phrase refers to that remote fact not yet clearly seen, but which is indicated by science, namely, "the addition of the forces to the substratum of matter which has resulted in the present multiplicity of elements."* Beyond, I dare not venture a conjecture. There I leave it.

To this the Professor made no reply. We sat a few moments in silence. I do not know what was passing in his mind. As for myself, I was revolving the question, How does spirit act upon matter? and then this unthinkable fact of existence, not that of God only, but my own and that of the universe. It was a temptation to wander off into such fields of speculation, but, remembering the limits within which we had agreed to keep, I put it aside for a more convenient season.

The Professor spoke: "But are you not becom-

*See Professor Cook's *New Chemistry*.

ing like the Talmudists, who find occult meanings in every word, and mysteries in the chance irregularities of the letters?" Objection 8.

There is the greatest difference, I replied. The Talmudists got away from the meaning as given by the grammar and lexicon; I am seeking to get as close to it as possible. They sought for mysteries in their inner consciousness. I am seeking for no mysteries, but to see if there are facts in the world's actual history which correspond to the statements of Moses. It seems to me that this is as unlike the method of the Talmudists as possible.

It will be wise for us to inquire in regard to what has already been said, or what shall hereafter be said, not whether it is new—that is a matter of little consequence; nor whether it is of importance, for of that we often cannot judge; but whether it is true, leaving other matters to be determined afterward.

But to return to our theme. What, according to present science, must have been the first visible effect of motion in that primordial matter?

"The emission of light. First, heat was generated, and as soon as that became sufficiently intense the whole became luminous. The discovery that forces are so related that motion generates heat and light is the glory of modern science. It is a part of that correlation of forces of which we have heard so much, and the true order of development is darkness,

motion, light—a discovery wholly due to the nineteenth century."

To this I agreed, and then called his attention to the order given in the second and third verses of this chapter, asking at the same time whether it was correct.

Of course he could not deny it, but, evidently fearing the conclusion which would be drawn from his admission, he said, "But surely the coincidence is merely accidental. Moses knew nothing about modern physics; then how could he have any knowledge of the relations of forces —relations discovered almost four thousand years after his death? Such a supposition was too absurd to be entertained."

Objection 9. The coincidence accidental.

I thought the coincidences were getting to be rather numerous, and therefore asked how many, according to the doctrine of chances, would be needed to prove them intentional.

He acknowledged the difficulty of accounting for many coincidences by any theory of accidents, but he was not prepared to say how far he would go rather than admit the possession of so much knowledge on the part of the author of this account.

From my stand-point, I answered, there is no difficulty in accounting for the possession of so much knowledge, nor any anachronism in imputing to the author of this narrative absolute familiarity with all

that scientists ever have, or ever will, discover; but from yours the difficulty is insurmountable.

To this the Professor made no reply, and as I did not care then to pursue that thought any further we let it drop.

After a little he said: "It seems to me that Moses makes a statement in the fourth verse which is contradicted by our present knowledge—a very natural error on his part, because when he lived nothing was known of the nature of light. Directly after the words, 'And there was light,' he says that the 'light was good.' Now, the Creator could not have indited this account, for he knew then, what scientists have just found out, that the early nebular light was not good light. It was very poor light indeed. Unfortunately for the truth of his story, the spectroscope, of which Moses knew nothing, has revealed the remarkable and hitherto unsuspected fact that the spectra of gaseous nebulæ are very poor in color and intensity. They show only three faint and very narrow bands of light, one in the blue and two in the green. Such light is good in no sense that I can understand. It certainly seems to me that this is an error which the All-wise could not have committed, and hence I cannot think of his being the author of this story."

Objection 10. Light pronounced good too soon.

You admit that light did appear in the nebulous matter, and after motion?

"Yes; there can be no doubt about that."

And, I added, although it was not perfected at first, yet that afterward it attained its present richness of color and actinic power?

"Yes; I must of course admit it."

Well, then, I asked, where is Moses in error?

"Why, in this: he says the light attained this condition of goodness *immediately* after it began to exist Science disputes that, for, in fact, light did not attain its present quality until many thousands of years later."

Pray, show me where Moses says so.

"It is true," he replied, "Moses does not say this in so many words, but he does place the one statement *immediately* after the other. He says, 'And there was light,' and at once goes on to say, in the very next clause, 'And God saw the light, that it was good;' and every body but you thinks he meant that the one followed immediately after the other."

Truth cannot be decided by counting its advocates. Error is almost always in the majority. Our business is with what Moses says and with the facts of the world's history, and with nothing besides. In his account I find the two statements with no intimation whether much or little time intervened, or even none at all. But no man has a right on the strength of this silence to charge Moses with saying that there was no interval; and then, because there really was an interval,

to accuse him of falsehood. This, it seems to me, is going beyond all fairness; and if so, your objection falls to the ground.

There is, however, something here to which I wish to direct your attention. A few years ago it would have been thought the proper order to place the verdict 'good' after the statement that God divided between the light and the darkness. People believed till lately that light and darkness, at first, were mingled as two substances, for example, alcohol and water; and that God, in some way, separated them. If so, then evidently, until that was done, light could scarcely be called *good* light; or in other words, the verdict should not have been given until after the separation. Up to the present century—I might almost say, up to the present decade—such would have seemed the scientific as well as the natural order. But, in fact, to have placed the verdict after that division would have been a real and important error, for we know that light and darkness are not two substances, and the division between them was not an unmingling, but a separation by an opaque body, just such a separation as now exists. This, of course, could not take place until the surface of the earth became covered with a dark crust. No other division between light and darkness is possible or even conceivable. But long before this point in world-making was reached the earth had passed through a con-

An important matter of order.

dition of the most intense heat—in fact, had been a miniature sun; and the spectroscope tells us that light emitted from such a body must have been identical with that which now comes from the sun, and hence 'good' light. It is probable that the sun itself had by that time reached a condition the same in all but size as at the present day, and hence its light, too, was 'good.' The verdict of approval and completion was therefore rightly placed before the separation between light and darkness. Only by a violation of the true order could Moses have placed the verdict later; and this is so, whether he referred to the light emitted by our earth or by the sun; in either case light was perfected before the earth ceased to be self-luminous.

As this seems to me a matter of importance, you will pardon me if I dwell upon it. Suppose, then, Moses had written:

"And God said, Let there be light: and there was light. And God divided the light from the darkness. And God saw the light, that it was good."

Such an order would have exactly harmonized with the old belief that a faint twilight, a mingled light and darkness, first shone upon our earth. Those who hold this belief might well speak, from their stand-point, of the wisdom of the writer in placing the divine verdict *after* the two elements had been separated, perhaps with a lurking belief that he would have done still better had he deferred it until after

the close of the fourth day. But had he so placed it, its position would have been in direct conflict with important facts in the world's history, facts which have only recently been discovered; in fact, only since the invention of the spectroscope.

The Mosaic order is: first, darkness; then, motion; then, light; next, the light is 'good'—that is, perfected; then, a division between the light and darkness; and, day and night begin.

Darkness. Light. Light good. A separation. Day and night.

Can it be bettered? Nay, is it possible to make the slightest change in it without the most serious consequences to what we call science? Instead of a blunder, there is here proof of the omniscience of the author of this account, the more marvelous because, until lately, it seemed just the opposite.

"This," said the Professor, "is a most extraordinary document! What you say about light is true. For as soon as the earth passed from a gas or vapor to a liquid its light must have been the same in all its properties as present solar light,* and I have no doubt that, at so late a period in cosmical development, the then solar light had attained all its present qualities, and it was after this that day and night began."

* It matters nothing in reference to my argument whether the interior of the sun now is liquid, or, as some think, enormously condensed gas. Whichever it is, our world, to reach its present condition, passed through the same state long before it became nonluminous.

To me there is nothing in the account so wonderful, and so unaccountable on any human theory of its origin, as the accuracy of its order even to the minutest details. I shall often have occasion to speak of this.

But these verses are rich in precious veins of truth; how rich we can know only when our knowledge has become perfect. One more, at least, I can now see.

Our world, as Professor Huxley told his hearers, in his New York lectures, and as all scientists believe, was once a mass of incandescent vapor, which passed by cooling to a liquid condition, self-luminous like the sun, then to a solid opaque planet. What circumstance, or perhaps it would be better to say, what phenomenon would have indicated to a spectator, had there been one, the close of the first or igneous period, and the beginning of the present, when the earth is dependent upon the sun for light?

"It is evident enough," he replied, "that the close of the one period and the beginning of the other were characterized by the complete cessation of the earth's emitting light, and, so far as I can see, by no other circumstance. Had we been supported at some point in space where we could watch the progress of the transition we would have noticed but little difference at first between the brightness of the side toward the sun and of that turned in the opposite direction.

But as time passed and the earth grew less and less hot, its light grew less intense, and a difference between the brilliancy of its two sides began to manifest itself. This increased until at last one side disappeared in the darkness of its own shadow, while the other was illuminated by the light of the sun. The completion of this process indicated the end of the igneous period and the beginning of the present. It was also the beginning of day and night; not, of course, of revolutions on its axis, but of alternate light and darkness.

"Excuse my boasting of science," said the Professor, "but is it not marvelous that by its aid we are able to tell of events in our world's history which occurred so many million years ago, and to point out the great final event of the igneous period, the beginning of the present, or true planetary condition?"

Yes, it is marvelous, and one can but stand in reverent wonder before the power of the human intellect. But to me there is something far more wonderful than that when I read in this narrative, written thousands of years ago by the leader of a semi-barbarous nation of fugitive slaves, as the closing fact in this first stage of world-making, that God divided between the light and the darkness; and then, as if more definitely to fix the meaning and the epoch, that God called the light day, and the darkness called he night; and notice that it is the very

circumstance which, as you have justly said, marks the close of the earlier and the beginning of the present condition.

As to the many events between the first appearance of light and this separation, Moses omits them all. In the nature of the case so brief an account could touch upon only a few of the most important transactions in the period of which it treats. He merely passes over the others, neither affirming nor denying any thing about them. Really, I can see nothing here with which science can justly find fault.*

Objection 11. "Moses says that the creation thus far occupied only one day."

"Why, there is this: astronomers have shown that this division occurred may ages after the first appearance of light, while Moses says the whole creation thus far only occupied one day."

Moses says that! Where does he say it?

"He does not say that in just these words. But it is his meaning."

I do not so understand it. (I then read aloud all the chapter down to the fifth verse.) I find, after several statements describing as many transactions, one saying that, as our version has it, the evening

* How large a book would have been required for all the important and interesting facts in those millions of years! Think of the volumes necessary for what is now known, and how little that is in comparison with what remains to be discovered. However much God might have revealed, it would always be a mere fragment of an infinite whole.

and the morning were the first day. Moses had just said that God divided between the light and the darkness, and that God called the light day and the darkness night; and as these were the first evening and morning—were they not the first?—he adds merely that they were the first day. Here is no error. They were really the first day.

"But," said the Professor, "I have been told by many, and have read it in commentaries, that Moses means, not that the evening and the morning were the first day, but that all thus far was done on that one day; and I know it is not so."

We agreed not to let our discussion wander off to what others have said. We have before us the narrative itself. We are not inquiring as to the truth of somebody's explanation or theory, but as to the statements of Moses himself, and he does not say that any thing was done on that day. It may and probably does mean that all thus far was done before that first day.

"If we are to be narrowed to that I must of course admit that the first evening and morning after that division were literally the first day of the earth. But for all that it seems hardly credible that so many persons should have thought Moses meant to say, God created things thus far in one day, if there had not been good grounds for their belief."

Many good men, I replied, have thought the stars

were specks of light, and the sun infinitely less than our earth. You do not find in their belief any good reason for rejecting the conclusions of more modern observers. Where they differ from present astronomers you do not make it a question of authority, nor even of numbers, with which you shall side, but you appeal directly to the volume of nature. As to what Moses meant it is equally right to appeal from ancient or modern commentators to the written record which he has left us.

"I must admit that he should not be condemned for what others have said. He should be tried by his own words, and certainly they do not say that all this was done in one day. But, admitting your exposition to be true, we know that this process of cooling was very long, and consequently that there was no abrupt change from a luminous to a non-luminous condition, and hence no day so marked. The change must have been imperceptible. How then can you speak of any one day when it was completed?"

Objection 12. No abrupt change.

True, the process was gradual, and so is the growth of a person from boyhood to manhood. There is a day up to which he is an infant, and on which he is invested with all the rights of manhood. You would think it strange to be accused of falsehood, or even of inaccuracy, because you spoke of the first day of your being a man. So in regard to our planet; it perhaps

was impossible to say at what moment the change from a luminous to a non-luminous state was completed. It may have been when the last lake of glowing lava was skimmed over with a black crust; but, whenever it was, it marked the end of the old condition and the beginning of the new. It was the natal day of a world.

Just then the striking of a clock reminded us of the lateness of the hour. We agreed to stop here and to resume our conversation the next evening.

Objection 13.

There is one objection to the truth of this account which its opponents for a long time thought fatal, and which has given its friends much needless trouble. To meet it they have devised some strange theories. I refer to the fact, long thought so unaccountable, that light is made to appear before the sun. Now we hear nothing of it, and as the reader, perhaps, has noticed, the Professor did not even refer to it. Of the correctness of this order there is not to-day the slightest question. I mention it only to note how the advance of knowledge sweeps away supposed difficulties. Our agnostic friends, with easy forgetfulness, seem not to remember that such an objection was ever made.

OUR SECOND EVENING.

THE THEME.

Genesis i, 6–8.

6 *And God said, Let there be a firmament in the midst of the waters, and let it divide the waters from the waters.*
7 *And God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament: And it was so.*
8 *And God called the firmament Heaven.*
And the evening and the morning were the second day.

On the next evening the Professor came a little before the hour agreed upon. We at once settled ourselves to work. I opened the discussion.

Well, Professor, we have followed the history of our world from that "beginning" which bounds the earth's nebulous stage, on the one side, to that first day which bounds it on the other, and I think you must admit that those who claim a contradiction between the Mosaic account and astronomy and geology, or other sciences, have not, as yet, been justified by any thing in the story itself. What adds to the marvelous character of this account is the fact that these statements relate to matters so profound that it is only within a few years that physicists have been able in some degree to see their wealth of meaning. Instead of this being, as has been flippantly said,

"a statement of obvious facts in the most natural order," the facts are not obvious, nor is their order that which would occur most naturally to one writing about the work of creation; for the former escaped the keenest observers and the latter the most profound thinkers until within a generation. The more I reflect upon the matter the more I am impressed with the statements here made. It will help you see their value if you look at them, not in their theological relations, but in their relation to science. Our agnostic friends say that what Moses wrote is either false or of trifling consequence. Let us see.

If it is not true that the heavens and earth had a beginning, then the sun has not been losing energy, or its stores would long ago have been exhausted. But, unless the sun is constantly giving off energy, all our present ideas as to force, energy, heat, and light are in error. Nor, if there was no beginning, can there possibly be a resisting medium in space, for, however small the resistance, if there was no beginning all the force which propels the planets in their orbits would infinite ages ago have been exhausted. Nor can there be any friction of the tides, or the earth would long ago have ceased to turn on its axis more than once in a year.

If the earth was never "without form and void," then it never was a portion of a nebula, nor even in a gaseous state, and the evidence from the igneous rocks,

and the present semi-fluid condition of Jupiter and Saturn, is all worthless. What would agnostic philosophy do without a world once formless and void?

If Moses erred when placing darkness before motion, then the correlation of forces is a myth, and we have absolutely no theory as to the nature of light. I call, therefore, upon those who deny the accuracy of the Mosaic order to give some theory of light which shall be consistent with light before motion.

If Moses was in error when he attributed the first setting in motion to the same source as matter, then he erred in common with the physicists of to-day, for the existence of motion is as inexplicable as the existence of matter.

If Moses errs when he places light after motion, then optics has no basis on which to stand.

If Moses errs when he says that the light was "good" before there was a division between light and darkness, and, consequently, before that alternate light and darkness which is called day and night, then all that spectroscopists have told us as to the kind, quality, and differences of light from gases, liquids, and solids is only a misleading fiction. It is worse than of no value, for it leads to error.

In brief, the correlation of forces, the undulatory theory of light—and the corpuscular too, for that matter—and the nebular theory, each is disproved, and the spectroscope shown to be of little worth, if

the physical statements in these verses are untrue or if their order is wrong. Surely these are no trivial matters.

"I must grant," said the Professor, "that there is here something very different from what I have been taught and have believed. So far as I can see there is no escape from your argument save on the theory that Moses did not mean what his words seem to say."

Objection 14. Moses does not mean what he says.

But that is not an escape, because we are not discussing the extent of his knowledge, but whether his words do, without unfair straining, describe conditions that once existed, and whether these conditions really occurred in the order in which he has (unwittingly, if you please) placed them.

"Well, then, if that be ruled out there is another answer which some will make, although I cannot adopt it. They will say matter has always existed and motion and force have always been. This is contrary to all that modern science has shown of the dissipation of energy.* It is a pure conjecture, founded neither on facts nor on argument, but is an assumption to avoid certain conclusions which otherwise appear inevitable. It leads to pantheism, if not to absolute atheism. If it allows of any

Objection 15. Matter has always existed.

* This dissipation of energy is a curious and interesting subject. See Tait's *Recent Advances in Physical Science*, pp. 20, 21. Also, Thomson, *On a Universal Tendency in Nature to Dissipation of Energy*, Proceedings of Royal Society of Edinburg, 1852.

God, it does not allow of a creator. He merely coexists with matter and force, if, indeed, he is not the product of the two. I cannot stultify myself with such a belief, for, although I have not been able to accept a revelation, yet I do believe in a creator.

"As I have said, I find this account a very different matter from what I expected, and I will add that I am anxious to know how you get along with the rest of it."

We will, then, take up the history of our globe from the time it became non-luminous, because, as you have already noticed, it seems easier to grasp the meaning of these pregnant sentences if we turn first to what science has revealed. What, just after day and night began, must have been the condition of the earth's surface?

"It must have been," he replied, "one vast expanse of scoriæ, or hardened lava, intensely hot, but not glowing. Above its surface was an atmosphere loaded with hot vapor, forming clouds of whose extent and density we can form some conception when we reflect that all the present waters, whether in oceans, lakes, or rivers, existed at first as steam. As there is water enough to cover the globe to the depth of about twelve thousand feet, the pressure must have been somewhere about six thousand pounds on the square inch from that alone, to say nothing of the carbonic acid and other impurities which also existed

as gas or vapor. Under such enormous weight, it is in accordance with all we know of vapors to believe that a large portion was condensed to a liquid long before the heat of the earth's crust sank to the temperature of boiling water. An immense amount must have remained as vapor, and covered the earth with an envelope of clouds hundreds of miles in thickness, and thereby excluded the light of the sun. On the earth's surface, therefore, were intensely hot waters, and resting on them dense clouds reaching far beyond the present limits of the atmosphere. On the outside of this envelope the sun shone as brightly as now, but within, and resting on the surface of the hot sea, was thick darkness." *

What, in your opinion, was the next step to be taken in the process of preparation for plants or animals to exist on the earth?

"It might seem a matter of indifference whether the dense clouds should be removed, thus admitting the light, and of course implying a temperature so low that life could endure it, or whether the land was elevated first. But this is wrong. Before the land was fit to be elevated above the waters there was a long preparatory process, during which the primeval rocks were broken and ground up to form

* The reader will recall the sublime words of the Almighty, "When I made the cloud the garment thereof, and thick darkness a swaddling-band for it."

gravel, sand, and finer material indispensable for future soils which should be capable of sustaining land plants and land animals. At the same time the waters were being purified by the removal of their excess of carbonate of lime, and other substances, which would have been fatal to all vertebrate forms of life, but which were indispensable components of the future soils. To bring about such removal corals, mollusks, and countless other marine creatures of the lowest forms were needed. I need not say that marine life required marine vegetation; and that both animals and vegetation were impossible without a lower temperature and sunlight. Hence it was not a matter of indifference which came first. It was necessary that the dense clouds should be thinned out, the water deposited, and sunlight admitted before the land was elevated above the seas. It is wonderful how science reveals even the order of Nature's operations!"

And what phenomenon, I asked, would have indicated to a spectator, had one been there, the close of this stage of preparation?

"I can think of no other than a transparent or open atmosphere, like the present, high up in which there might be floating clouds, but which was clear enough to permit the heavenly bodies to be seen. Such an atmosphere would indicate a temperature at which the lower forms of life would be possible."

Now, please compare what you have been saying with that which is found in this narrative, and which Moses says did occur. He tells us that God (through his laws, if you please) made an expanse—*rakia*, he calls it—"in the midst of the waters." Here you will notice a verbal nicety, which, in view of the actual occurrences, and in connection with the general drift of the account, seems to be worthy of attention. The expanse was to be formed "in the midst of the waters"—that is, there were waters above it as well as below it when it began to form. The process began not at the top nor at the bottom of the waters, but in the midst. Now place that in the light of your remark a few moments ago, that under the enormous pressure much of the vapor on our globe must have been reduced to a liquid form at a temperature far above the boiling point, 212 degrees Fahr., and you will see that the description is in harmony with the fact. The expanse, or clearing, began most probably near or at the surface of the waters already condensed—water below and water in form of vapor and dense clouds above the inchoate expanse. Letting this pass, you will observe that after the expanse was completed the account says there were waters above it and below it; and, lastly, that it so reached out into space that it formed a sky, and, as Moses expressed it, "God called it heaven." Certainly we cannot complain of any disagreement here.

"Yes," he replied, "this is all very curious, and perhaps more than curious, but does not your exegesis lead to an absurd result? You say that the *rakia* is the open space above us, and more especially that part between the clouds and the waters in the seas; and in the account we read, as you have said, that God called the '*rakia*' heaven; and further on, that God placed the sun, moon, and stars in the '*rakia*' of heaven. Now, does it not fairly follow that Moses must have believed that these bodies were somewhere in the air?"

Objection 16. A literal exegesis leads to an absurdity.

I think not. I have already referred to the wonderful descriptive power of the Hebrew. In this lies the explanation. "*Shamayim*," the word translated "heaven," is literally the high place. Now, what could be more natural and appropriate than to style the expanse from the earth upward to the clouds and beyond, the "*shamayim*," and then, by a common use of words, to include in it all that it seemed to contain, and so extend the word not only to the limited "high regions" of clouds, but to all that could be seen in the "*shamayim*"—the high regions beyond?

One, however wise, if he employed human language at all, could do no otherwise than speak of sun, moon, and stars as situated in the "*shamayim*"—the word in most common use among the Hebrews to describe

all that we now include in our English term heavens.

But we have yet to note the order of these great events. The depositing of the water and the clearing of the atmosphere are not represented as occurring before the division between the light and the darkness. Had they been so placed you could justly claim that Moses had made an error, for we know, although he did not, that before the division—that is, before the earth ceased to be self-luminous—its surface was too hot for such a process. Indeed, it is highly probable that while the earth was molten water existed only as it does now in the sun—that is, as hydrogen and oxygen.

On the other hand, if Moses had said that this great event occurred after the dry land appeared, geologists would justly claim this as an error, for they tell us that the continents came up out of the water. And, as you remarked a few moments ago, it was not a matter of indifference which came first. The possibility of land plants and animals existing depended on the order of these events. If the continents had been raised to their present elevation before the waters were deposited, they would have remained barren wastes of naked rock to this day. I ask you, therefore, to notice that whatever the source of this account, the order in which it places these two great events is that which you claim as one of the wonder-

ful discoveries of science. In short, this stage of progress has its proper place just where Moses put it. There it is true; elsewhere it would have been a blunder.

To this the Professor replied: "While I cannot deny what you say, I must say this is not Genesis, if I am to believe the general voice of commentators and of the Hebrews themselves, who certainly understood their own language. They thought there was over them a real firmament, something solid, which held up the heavenly bodies and had doors and windows. This idea of vacant space, vacant as to any solid support for the sky, is a modern thought for which the world is indebted to science."

Objection 17. The Hebrews thought the firmament solid.

I shall not discuss the claims of science; our business is with Genesis, and the question is not as to what some one else has said or written, but as to what Moses said. Did the word "*rakia*," translated in our version "firmament," convey at that time to any one the idea of solidity, or was this meaning tacked on long after in harmony with the "science" of a much later age?

"Of course, every scholar knows that *rakia* means *an expanse;* but how did it happen that so many among the earliest commentators attached to it the sense of solidity?"

That could be explained, I think, by the false

"science" of their day. They had great confidence in their knowledge, and, possessing at the same time a rugged belief in revelation, they forced the two to agree, and interpolated the idea of solidity to make the statements of Moses harmonize with their belief in crystal spheres rising above the earth like so many watch-glasses. It is a hard lesson, not yet half learned by the friends or opponents of that story, to take its words as they are and let the truth take care of itself. It must be remembered, too, that the very earliest commentators and translators lived so long after Moses that they had no special opportunity of knowing what he or his contemporaries understood by the word mistranslated "firmament."

As the "error" of Moses in calling the expanse a firmament has been a stock argument against the truth of this narrative I asked my friend's permission to read part of an article which I wrote for the *Bibliotheca Sacra*, and which appeared July, 1879. I turned to the article and read as follows:

"'Whoever,' it is said, 'wrote the first chapter of Genesis left upon record that "God made a firmament," by which was necessarily conveyed to the Hebrews then living the idea of something solid, a strong crystalline arch, rising as a dome above the earth and separating the waters in the seas below it from certain other waters above it. As no such arch exists, the writer who said so could not have written

under the guidance of One infinitely wise.' The mind refuses to attribute error to God, and hence it is difficult to see how the conclusion is to be avoided if the premises are correct.

"It becomes, therefore, important to discover whether *rakia*, rendered firmament in our version, was employed by the early Hebrews to convey the idea of firmness and solidity. The word occurs nine times in the first chapter of Genesis; but a careful scrutiny fails to reveal any shade of meaning that may not be equally well expressed by expanse. The only apparent exception is found in the statement that the *rakia* divided the waters from the waters. When men began to philosophize they found, as they thought, a physical absurdity in the idea of a mere expanse sustaining the volume of water which at times descended to deluge the ground; therefore they translated *rakia* by *stereoma*, a firmament, something solid, and so, by forcing the language to suit their 'science,' got rid of a supposed difficulty, one, however, which existed only in their own imagination.

"But it may be said that although 'expanse' is in harmony with the facts of nature, yet Moses did not know it, and consequently used the word *rakia* because it expressed the solidity and firmness which in his opinion really existed.

"If this is true, the idea of solidity and firmness

should be clearly found in the radical meaning of the word *rakiâ*, and in its cognates as employed elsewhere. Should this be the case, then we must admit that Moses committed an error; but if, on the contrary, the idea of solidity and firmness should prove to be wanting, then the charge of error, so far as it is based upon the use of that word, fails.

"*Rakia* occurs outside of this chapter only eight times. In Dan. xii, 3, we read: 'And they that be wise shall shine as the brightness of the *rakia*.' Here, certainly, is no assertion of solidity, nothing to forbid the use of any expression denoting the sky; as, for example, 'heaven.' When Ezekiel says, 'The likeness of the *rakia* was . . . as the color of the terrible crystal' (Ezek. i, 22), he speaks not of solidity, but only of color. Nor is there any such idea in verse 23: 'Under the *rakia* were their wings straight.' So in verses 25, 26: 'There was a voice from the *rakia* that was over their heads, . . . and above the *rakia* was the likeness of a throne, as the appearance of a sapphire stone.' And again, in x, 1: 'In the *rakia* . . . there appeared over them as it were a sapphire stone, as the appearance of the likeness of a throne.'

"In none of these is there any idea of solidity necessarily connected with *rakia*. On the contrary, throughout this mystical imagery there is a careful guarding against it. The prophet says that the *rakia* was glorious in color and appearance. It was not

crystal; it was the color of crystal. It was not a sapphire stone; but over it, or on it, was the appearance of a throne made of sapphire stone. It is probably impossible to reduce this mysterious vision to actual form, harmonizing every detail. Yet in some of its grand outlines we may succeed.

"As the prophet stood by the river Chebar, a great cloud arose in the north. Out of its mist seemed to come four living creatures. The part of the cloud over their heads glowed in the light emanating from these beings, 'like the terrible crystal.' They stood below this canopy, with their wings straight, one toward the other. The prophet heard a voice from above it, and, looking up, saw above all as it were a throne of sapphire stone, and upon it the figure of a man. In short, the appearance over them was as the brilliancy of that eastern sky. It was the glorious expanse, and was appropriately described by *rakia*, taken in one of its secondary meanings, which will be hereafter discussed.

"The word *rakia* occurs elsewhere only twice, both in the Psalms. Psa. xix, 1: 'The heavens declare the glory of God, and the *rakia* showeth his handywork.' Here *rakia* is in apposition with heavens, and no more conveys the idea of solidity than would our word 'sky.' Psa. cl, 1: 'Praise him in the *rakia* of his power.' Here the same idea occurs as in the previous text. It means no more than 'in

the heaven of his power.' And this recalls Gen. i, 8, where God calls the *rakia* heaven.*

"It seems that from these passages alone the idea of a solid support could never have occurred to minds not preoccupied with the 'science' of their own age, when men had begun in an imperfect and blind way to philosophize on the phenomena of nature.

"But it may be replied that the idea of solidity and firmness so enters into the radical meaning of the word and its cognates that we are forced to believe that Moses himself thought that there really was a strong solid arch above the earth, and intended to be so understood. Let us see.

"Turning to the lexicon I find: '*Raka*, the root of *rakia;* to beat, to stamp, to beat out—that is, to spread out or to expand by beating,' etc. Cognate with this is, '*Rakak*, to beat or pound, especially to spread out by beating, to beat thin.' Then there is, '*Rikyim*, plates or laminæ;' '*Rakia*, a thin cake or wafer;' '*Rakkah*, thinness, something thin; hence the temple, or part of the head;' '*Rak*, thin, lean, said of cattle;' '*Rakach*, to spice [the primary idea seems to lie in the pounding of the aromatic substances]; hence *rekach*, spice, and *rokach*, a perfumer,' from the same idea of pounding up the aromatic substances.

* Read these two texts in the light of the full meaning of *rakia*, as it will be developed further on. "In the *rakia* of his power" will be found a wealth of meaning hitherto unsuspected.

"Thus far, at least, there is nothing denoting solidity or firmness involved in *rakia* itself, or in any word allied to it.*

"In all cases, as far as I can discover, it and its cognates are used to denote thinness or expansion, almost always associated with more or less noise and violence.

"The absence from the Hebrew word of the idea of solidity and firmness, which are the very essence of a firmament, is not in harmony with the statements in Bible dictionaries. This greatly perplexed me at first; but when I turned to the passages referred to as proofs my perplexity was turned to surprise;

* According to the Hebraist's Vade Mecum, the verb *raka* occurs only eleven times in the whole Hebrew Bible, all of which I quote as translated in our common version:

1. Ezek. vi, 11, "Smite with thine hand and *stamp* with thy foot."
2. Ezek. xxv, 6, "Because . . . thou hast *stamped* with the feet."
3. 2 Sam. xxii, 43, "I did stamp them as the mire of the street, and *did spread them abroad.*"
4. Isa. xl, 19, "The goldsmith *spreadeth it over* with gold."
5. Isa. xlii, 5, "He that *spread forth* the earth."
6. Isa. xliv, 24, "That stretcheth forth the heavens (*shamayim*) alone: that *spreadeth abroad* the earth by myself."
7. Psa. cxxxvi, 6, "To him that *stretched out* the earth."
8. Exod. xxxix, 3, "They *did beat* the gold *into thin plates.*"
9. Num. xvi, 39, "And they *were made broad plates*," etc.
10. Jer. x, 9, "Silver *spread into plates* is brought from Tarshish."
11. Job xxxvii, 18, "Hast thou with him *spread out* the sky?" etc.

An examination of the above reveals several interesting facts. In 1 and 2 the idea seems to be purely the *noise* made by stamping with the foot either in despair or in exultation, and the word *raka* is justly rendered in the Septuagint by *psopheo*, and with no reference to the other idea of spreading out or expanding. In 3 there is no reference to the sound, but only to the spreading out; so in 4, where *raka* is

for in nearly all that were quoted as evidence of the Hebrews' belief in a firmament the word in question is not to be found. In Smith's *Bible Dictionary* I find the following: 'Heaven; there are four Hebrew words thus rendered in the Old Testament: First, *Rakia*, a solid expanse. Through its open lattice (Gen. vii, 11; 2 Kings vii, 2, 19), or doors (Psa. lxxviii, 23), the dew and snow and hail are poured upon the earth (Job xxxviii, 22, 37). This firm vault Job describes as being strong as a molten looking-glass (Job xxxvii, 18).' [In not one of these seven texts does *rakia* occur!]

translated by *perichruseo*. In 5, 6, 7, it may be that the allusion is only to the spreading out; but to the ear of one who, with the writer, believes that the Bible was in a very real sense indited by Him who was himself the Maker of that first *rakia*, there is in the use of the word here an echo of the tumultuous deafening violence when first the down-pouring oceans beat upon the hot lava crust whose ridges and peaks then formed the rough face of the earth. Whether this be so may not be as clear to others; but I think all will agree that our English version, to *spread abroad or forth*, or *to stretch out*, is reasonably near the original; while the *stereoo* of the Septuagint is a gross mistranslation, or, rather, it is no translation at all, but the substitution of another idea to accord with the philosophy of their own day.

With the same unhappy prepossession in favor of solidity the Seventy have rendered this word *raka* in 11 by *stereoo*, as well as in 5, 6, 7.

In 8, 9, 10, there is the proper meaning of beating into *thin* plates, not plates *thick* and *strong*.

It is curious to note that this word has always its proper rendering in the Septuagint except where the philosophy of that day is concerned. Bearing this in mind, I am led to the conclusion that these texts confirm what has been said in the previous article about the signification of *rakia*.

"'It is transparent as a sapphire and splendid as crystal, Dan. xii, 3; Ezek. i, 22 [I have discussed these a few paragraphs back]; Exod. xxiv, 10 [*rakia* not found here]; over which rests the throne of God, Isa. lxvi, 1 [no *rakia*], and Ezek. i, 26 [already discussed a few paragraphs back]; and which is opened for the descent of angels or for prophetic vision, Gen. xxviii, 17; Ezek. i, 1 [found in neither of these]. In it, like gems or golden lamps, the stars are fixed,* Gen. i, 14, 19 [found here, and already discussed]; and the whole magnificent, immovable structure, Jer. xxxi, 37 [*rakia* not here], has its pillars or strong foundations, Psa. xviii, 7; 2 Sam. xxii, 8; Job xxiv, 11' [*rakia* in none of these].

"The writer, the Rev. Frederick W. Farrar, late Fellow of Trinity College, Cambridge, makes a clear case for a solid support, or firmament, until one finds that in fifteen of his proof-texts (the only ones that have any bearing upon the question of solidity) *rakia* does not occur. Nothing can be learned from them as to the use of this word. Whatever they teach as to other words, it is clear they tell us nothing about *rakia*.

"He adds: 'In the Authorized Version heaven and

* "In it, like gems or golden lamps, the stars are fixed." Moses makes no such statement. He simply says God made the stars, and placed them in the expanse. It would be much better not to put words into his mouth.

heavens are used to render not only *rakia*, but also *shamayim*, *marom*, and *sh'chakim*, for which reason we have thrown together under the former word the chief features ascribed by Jewish writers to this portion of the universe.' Unfortunately for this explanation, heaven and heavens are not used in a single instance in the Authorized Version to render *rakia*. In most cases *shamayim* is the word so translated. Whether the Hebrews attached the idea of solidity to that does not concern our present inquiry. It will suffice to say that it means literally 'heights,' and there is no more reason for thinking that they took literally such expressions as the 'windows of heaven' (not of the *rakia*, remember, but of the *shamayim*) any more than that they did that verse in Job which speaks of 'the bottles of heaven' (also *shamayim*).

"From all this it is clear, I think, that the science which demanded crystalline spheres to uphold the heavenly bodies was of a much later date than the time in which it was written, 'He stretcheth * the north over the empty place, and hangeth the earth upon nothing.'

* It is an interesting fact that "rakia" is not employed here. The reason is obvious: there is no possible allusion, near or remote, to, or connection with, the noise and violence which help to make the radical meaning of the word. The distinction is nice, but eminently philosophical, and in the light of present knowledge perfectly intelligible. Every fact known to science was infinitely better known to God then than it ever can be to us. As far as he is concerned an anachronism is impossible.

"What, then, is the meaning intended to be conveyed by *rakia?* From a careful consideration of all the places where this word and its cognates occur it seems that the radical idea of the verb is (*a*) to spread out with violence and noise, or, rather, it is to make thin in that manner. Its sound is indicative of its meaning —a thing common in all languages, as, for example, we speak of the buzzing of a saw, the whizzing of an arrow, etc. *Rak-a*, or its cognate *rak-kak*, represents to the ear very closely the noise or racket of the mechanic beating or hammering thin a piece of metal—a sound more common in the times before the process of rolling out metal had been invented. It is noise and violence, not firmness nor solidity. Then succeeds the more abstract idea (*b*), an expanding or thinning produced by violent action accompanied by loud noise. Lastly (*c*), there is the idea of mere expanse, without any particular reference to the violence or noise.

"Such changes of meaning are common in all languages. We may say: 'Casting iron is very hard work.' The hearer at once thinks of the severe muscular labor of the men engaged. If we say, 'Casting iron requires much skill,' he will think of the proper mixing of different qualities of the metal, of the best methods of melting, and the means of determining the proper temperature. But if we say, 'The boat is loaded with castings,' he thinks only of

the results of that operation, and, although the word 'casting' carries with it a suggestion of the heat and labor, yet he will not think of them.

"The changes in the meaning of *rakia* are analogous to these. It is only at the present day, when science has revealed the scene at the time when the first deposition and separation of the waters occurred, that it has become possible to grasp the wealth of meaning in the word *rakia*.

"This is the story which geology tells: At a distance back in eternity whose remoteness our arithmetic is powerless to compute, but after the earth had ceased to be self-luminous and a somewhat lower temperature had changed the invisible vapor of the future oceans into dense masses of clouds hundreds of miles in thickness, the time came for the second divine fiat. In the language of science, the temperature had fallen to the point at which the waters began to condense and descend upon the yet hot earth-surface. Think of the noise, the violence, ten million Niagaras pouring down at once into as many Etnas. No pencil can paint the scene; but we may imagine something of the hot rocks rent by the sudden cooling, the noise of the falling oceans, the added uproar of such electric disturbances as never will be known again until the 'crack of doom.' In throes such as these began the clearing of our atmosphere, perfected through æons of time, until the ocean-holding cloud was thinned down to

those that now float in the upper air; the thick darkness caused by the dense masses of primeval, misty vapors that rested on the surface of the earth, grew less and less, until at last the light of the sun passed freely through, and a transparent expanse divided the waters from the waters. When, in after ages, there came a seer to record what had taken place, we may imagine him searching to the foundation his mother-tongue to find the word which should best depict the scene. Guided by the All-wise, he selected *rakia*, a word which no other language can equal in power of conveying the threefold idea of an expanse produced by violent physical action and accompanied by noise. 'Expanse,' the best word our English can give, is poor indeed in comparison.

"In these senses (*a*, *b*, *c*) the false philosophy of the Septuagint disappears, and in its place is absolute truth. If the texts above quoted, containing this word, be read in this light we shall find dominant the secondary idea (*c*)—that is, an expanse only, without reference to the mode of its formation.

"In the first chapter of Genesis all the meanings are found. In verses 6 and 7 it is, 'Let there be a thinning or expanding in the midst of the waters,' carrying with the word an echo of the violence and noise of the process. In verse 8 the writer speaks of the expanse after the noise and tumult had subsided. It was the quiet, open expanse extending through

and beyond all limits of vision, which God called heaven.

"Again, in verses 14, 15, 17, and 20 occurs the same use as in verse 8. It is the completed expanse of to-day, carrying with it, save in the suggestive sound of the word, no reminiscence of the primeval throes which accompanied its birth.

"This combined idea of thinning and expansion, as here applied, comes somewhere near to that conveyed by our words, 'an open space.' But *rakia*, in its intense truthfulness, describes the exact fact. To it no captious criticism can contrive objections; whereas, had Moses said, 'Let there be an open space in the midst of the waters,' we should have been told that such an expression was clear proof of his ignorance of the depths of science which the future was to reveal; for all philosophy teaches that the apparently open space is absolutely full, and that, so far as we know, there is nowhere in the universe a vacuum. Thus that which has been claimed as an argument against the truth of the Mosaic account is found, when tested in the light of science, to be a witness in its favor.

"Considering the general belief at the time of the apostles in a crystalline arch over the earth to support the heavenly bodies, it is very remarkable that no expression is used by them indicating such a thing. The writers of the New Testament were familiar with the Septuagint and the use in it of *stereoma;* yet

they carefully avoid the word. Indeed, it occurs but once in the entire New Testament; and then it is applied to the faith of the early believers in the expression, 'the steadfastness of your faith' (Col. ii, 5).

"I cannot close this article without speaking of a text often quoted by friends, as well as foes, to show that the Hebrews, or at least the countrymen of Job, did believe in a solid crystalline arch. It occurs in Job xxxvii, 18. Our version reads: 'Hast thou with him spread out the sky, which is strong, and as a molten looking-glass?' The word here rendered 'strong' does not mean strong in the sense of solid or firm, but, as its derivation shows, strong in the sense of securely tied or fastened. It is the idea of binding up to its place securely, not by solid mason-work, nor even by nails, but by bands and ligatures. 'Molten' here is used in the sense of melted or fluid. I would suggest the following translation as more literal: 'Hast thou with him spread out the securely fastened sky, as it were a liquid mirror?'

"If the speaker had really desired to compare the sky to something solid and firm he would never have compared it to a molten (in the sense of cast, as cast brass, for example) mirror. A hammered mirror would have been stiffer than one made by casting. We have the notion of stiffness and firmness in connection with cast metal from our familiarity with cast iron. I doubt if Job knew any thing of that metal.

Silver, brass, or other metal, except iron, is softest when cast and becomes firm by hammering.

"Elihu compares the sky (the clouds, literally) reflecting the brilliancy of an eastern sun to a glowing molten (melted) mirror, somehow securely held by the Almighty. He mingles the thought with that, so natural to dwellers in that land, of a canopy stretched out overhead, and, in tent-style, tied up with bands and cords. He says to Job: 'Are you so great and strong that you can do that?' Pointing to the bright clouds, he asks: 'Can you with him spread out these clouds, so securely held in their places and sending back the light as if they were a mirror of glowing, melted metal?'

"I submit that this text has done forced duty long enough, and that henceforth it be permitted to speak to us as, I doubt not, it spoke to Job.

"No one has the right to draw from the usual rendering, even if it were correct, any argument against the inspiration of the Bible. Job's three friends were rebuked. We have no intimation that their philosophy was inspired any more than their theology. No more responsibility attaches to the Bible for their sayings than for those of Pharaoh or others whose words are recorded. The largest inference that can be justly drawn is that, if the common translation is correct, Job and his friends had erroneous views of the firmament, as hundreds of good men have had since."

The Professor listened patiently while I read; then he said: "I must admit that the idea of firmness and solidity seems quite foreign to the Hebrew word, and I must withdraw what I had regarded as a serious objection. But, admitting all this, we are not yet out of difficulty, for Moses teaches all this occurred in one day; the second day, he calls it. Until scientists had shown the absolute absurdity of such a statement all biblicists agreed that this stage of progress was begun and ended in twenty-four hours—or rather in twelve hours, for they excluded the night—and, I may add, many believe so now."

Objection 18. All till lately believed the firmament was made inside of twenty-four hours.

Once more I protest against bringing in the opinions of others, as they are of no importance save so far as they are sustained by the words of Moses. It is only the narrative that any body claims to be inspired. In that I find no assertion that this work was done in one day, nor, indeed, any reference whatever to the time employed. The writer says, "God made the 'rakia,' and divided the waters which were under the 'rakia' from the waters which were above the 'rakia;' and it was so,* and God called the 'rakia'

* The translators of the Septuagint, with their desire to improve upon and correct the errors of Moses, removed the words "and it was so" from the seventh verse, where Moses put them, and annexed them to the sixth. To the seventh they added the words, "and God saw that it was good"—kalon—that is, beautiful and good. In like manner they interpolated into verse 20 the words, "and it was so."

heaven." And after that a day is spoken of which is called the second day. It marks the completion of this act and separates it from the next. As marking the conclusion of so great an event as the deposition of the waters, the clearing of the atmosphere, the admission of the sun's rays, and the consequent possibility of life, was it not well worthy of the distinction? It was the second of these epoch-marking days.

"Certainly," he answered, "the day which marked the end of that great step in world-progress was well worth commemorating. But this is a new kind of Genesis which keeps so close to the letter of the text. Think to what absurd results it will lead. What, by such strict literalism, will become of the rest of the Bible?"

Objection 19. With such literalism what will become of the rest of the Bible?

I find nothing absurd here. As to other parts of the Bible, they are not now under consideration. To speak of them would lead us away from the work which we have undertaken. I will say, however, in reply to your question that I expect to use in all parts of the Bible the same common sense which other books demand, and which, so far as I can see, is not opposed to any thing in this chapter.

But to return to the matter in hand. Will you tell me what was the condition of the atmosphere when—and for a long time after—the waters were deposited?

"It is evident from the immense quantities of carbon in the coal and lignites, all of which must once have been in the atmosphere, that it was heavily loaded with carbonic acid gas." *

Could such an atmosphere have supported the higher forms of life?

"No. It would have been fatal to all present air-breathing animals, unless possibly some of the lowest forms might have managed to live. Certainly no vertebrate could have endured it. But why do you ask these questions? What have they to do with this account?"

Much, as you will see. If you will read the narrative through you will notice that the verdict "good" follows each stage of progress from the first day to the last, except this, an exception that has puzzled many a reader, and which some—the Septuagint, for example—have tried to remedy by interpolating such a verdict here. "Good," in all such matters as these, can have no reference to moral quality, but only to complete fitness for some purpose, which I take to be for the use of the coming man. And certainly an atmosphere loaded with poison was not "good." This omission—unintelligible down almost to the present

* Whether or not those geologists are right who assure us that during the Carboniferous age the atmosphere could not have been loaded with carbonic acid, is, in reference to the period of which I am speaking, a matter of no consequence. The "second day" antedates, by millions of years, the Carboniferous age.

day—is another of those significant circumstances that go to prove the exhaustive knowledge possessed by whoever was the real author of this chapter.

"This certainly," said the Professor, "is very curious and very difficult to reconcile with any theory of chance. It is in perfect harmony with the facts, and yet they have been known for scarcely a generation."

With this our discussion ended for that evening. We agreed to meet at the same place soon.

OUR THIRD EVENING.

THE THEME.

Genesis i, 9–13.

9 *And God said, Let the waters under the heaven be gathered together unto one place, and let the dry land appear: and it was so.*

10 *And God called the dry land Earth; and the gathering together of the waters called he Seas: and God saw that it was good.*

11 *And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit-tree yielding fruit after his kind, whose seed is in itself, upon the earth: and it was so.*

12 *And the earth brought forth grass, and herb yielding seed after his kind, and the tree yielding fruit, whose seed was in itself,* after his kind: and God saw that it was good.*

13 *And the evening and the morning were the third day.*

THE Professor took up the Bible and read the ninth and the following four verses, then said, "How shall we continue the discussion?"

I proposed we should go through the account, statement by statement; inquire at each what does the science of to-day teach in reference to that particular matter, and see whether there is agreement, or whether there is the contradiction which is by many so confidently claimed.

The ninth verse teaches that what is now dry land was once under water. Is that true? Was it so?

* In which (fruit) is its (the tree's) seed—that is, fruit-tree whose seed is in its fruit. See Dr. Conant's *Genesis* on this verse.

"Professor Dana says, 'The envelope (of water) was nearly or quite universal,' or, as Professor Huxley puts it in his New York lectures, 'all that is now dry land was once at the bottom of the sea.' The continents at first formed vast submarine plateaux lying some hundred feet, or possibly fathoms, beneath the surface" (Dana's *Manual of Geology*, page 160).

Then, so far as I can see, you must admit that this command, "Let the waters be gathered unto one place, and let the dry land appear," stands in its true order, to wit, after the completed deposition of the waters once all suspended as vapor above the earth. Is there any error in this?

"No; I cannot say that there is."

I note, too, I continued, that the writer says, Let the waters be gathered unto one place, and it was so done. They were gathered unto *one* place. Is not that right according to geography? Are not present oceans and seas really one body occupying one great depression in the earth's surface; the different names being only for convenience to designate parts of one great whole?

"Yes. And I must say it is remarkable that a Hebrew, with the little geographical knowledge of his day, should have so written. There were three large bodies of water known to him—the Mediterranean, the Red Sea, and the Persian Gulf or Sea, and it is unlikely that he knew that they were connected.

It would have been the most natural thing in the world, and from his stand-point the only right thing to say, 'Let the waters be gathered into not one place, but into their places.' Yes; the account is right, and I must admit the fact is a very surprising one.

"But, following these statements, there appears to be one of those blunders of which I spoke when you proposed this discussion, one which destroys all belief in the inspiration of the narrative. For you must admit that one falsehood as completely disproves all claim to a divine origin as if there were many. I refer to the sudden and abrupt character of the account. The writer says, or at least we are so told, that the dry land appeared instantly, or, at most, in a few hours. God said, 'Let the dry land appear,' and at once it rose all complete above the waters, just as in Eastern tales when the magic name of Solomon is pronounced palaces rise in a night. Now every geologist knows that the appearing of the dry land was a very long process, beginning unnumbered ages in the past, and continuing through archæan, paleozoic, and mesozoic times, down through most of the tertiary, until its completion in the comparatively recent pliocene. I say 'comparatively recent,' because it is very near this end of the geological record, but far enough distant for all that."

Error 20. "The dry land appeared instantly."

Then this blunder, this fatal blunder, depends

upon whether Moses says the appearance of the dry land was an instantaneous or an almost instantaneous act which immediately followed the fiat. Please show me where he says so.

"You ask me to show you what no one supposes is in the account in so many words. But is it not fairly implied? Moses does not say any thing about the process being a long one."

True; but not saying it is a very different matter from saying just the contrary. Nor can we justly draw any such inference from the mere juxtaposition of the command, and the account of its accomplishment. We admit this principle every-where else. Were I to say, "Napoleon was banished to St. Helena, and there he died," could I, with any fairness, be charged with asserting that he died immediately or very soon after he arrived on that island? Implication has its office, but that is not to prove any thing; at most it is only suggestive, and needs to be tested in every possible manner. No; the error of which you speak is not here.

"But I heard a minister once preach from the text, 'He spake, and it was done,' and to him it was proof positive that the creative work was done instantly—no delay whatever.

"To me, of course, it proved nothing, as the Bible, in my estimation, is no more than any other good book; but to you, who profess to receive it as from

God, the case is different, and I do not see how you avoid the conclusion."

We agreed to confine ourselves to the first twenty-seven verses of Genesis; and as they were written hundreds of years before your text they are quite independent of it. I will say, however, that I see in it only obedience—prompt obedience, I admit; but that consists in at once beginning to obey. The act of obedience, in all cases, requires more or less time; but neither the text quoted nor this story gives the slightest intimation as to how much time was required in this instance.

"If, as you insist, we are to hold to the letter of the account, I must of course admit that it does not say or necessarily imply that the uprising of the land was a short process, and I suppose I must withdraw my objection.*

* I add here some remarks in regard to the time when the continents were completed, as they are necessary to a comprehension of the subject, and to meet objections which others who do not possess the Professor's knowledge of geology may advance.

"In the tertiary there was (1) the finishing of the rocky substratum of the continents; (2) the expansion of the continental areas to their full extent, or their essentially permanent recovery from the waters of the ocean; (3) the elevation of the great mountains of the globe, or a considerable portion of them, through a large portion of their height, as the Alps, the Pyrenees, Apennines, Himalayas, Andes, Rocky Mountains, the loftiest chains on the globe—a result not fully completed until the close of the tertiary"—that is, in the pliocene.

The non-geological student will do well to study the above carefully. It is taken from Dana's *Manual of Geology*, page 586, and is sufficient answer to any who may claim that the land could not prop-

"But," continued the Professor, "what does 'good' mean here—'and God saw that it was good?' It seems a misnomer if it refers to moral character."

I have already said, when speaking of the firmament and of light, that things without souls can be good only in the sense of being fit or complete for some use or purpose. I take this to be the only meaning applicable to the water and the land. The

erly be said to have been fully developed (or caused to appear) by the end of the tertiary, because large portions were afterward submerged and additions made to its area. It should be remembered that subsequent submergences were only temporary, the land coming up again essentially unchanged in its outlines and grand features. From these changes there resulted little more than a more convenient arrangement of the gravels, clays, and sands, and the deposition of a final coating of alluvium, which enriched and ultimately beautified the earth. As to the additions to the area of the continents since the pliocene—the end of the tertiary—they consist mainly of deltas, or of such increase as came from local coast elevations. All combined are inappreciable in comparison with the broad extent of the land at the close of that period.

Whatever discrepancy may seem to exist between this and what has been said as to the completion of the land in the tertiary does not in the least affect the harmony of the Mosaic statements and the facts of geology. If any discrepancy seems to exist there, it arises from leaving the words of Moses, and using in their place certain inferences which we have drawn from them. He does not say that nothing further was done to the land, but only that the land and sea had then arrived at a condition which, in the eyes of the divine World-builder, was good, and certainly if the present arrangement is a good one—as physical geography says it is—that was.

That certain finishing touches were fondly given by the Master's hand between this verdict and the time when the world was given to man is at least fairly intimated by the fact that then it received a higher meed of approval. It, with all the work of the creative periods, was pronounced "very good."

appropriateness of the term becomes apparent when we consider the condition of the earth at first and the changes subsequently undergone. The sea then covered all the earth. The waters, from the quantity of lime, silica, and other impurities held in solution, were poisonous to the higher forms of life which were ultimately to be produced. Not only was the land at first under water, but it was merely hardened lava. Soil needed to be produced. Internal forces began slowly to lift up the submerged continents. Myriads of tiny creatures set to work to remove the mineral matters; marine vegetation began to take up the excess of carbonic acid and to throw back the oxygen, to make a better atmosphere. The disintegration of the rocks by lichens and other plants, the pounding of the waves, the action of fire and other agencies, slowly reduced the hard lava to powder, the basis of all soil. This needed to be enriched by the lime taken from the sea and by carbonaceous matter from the decomposition of plants and animals. All these, worked over and over, resulted at last in a soil able to sustain the final development, the highest types of plants, toward which all vegetation tended. The land then was appropriately said to be good. The preparation of the seas went on with that of the land, till they attained a condition when modern types of fishes could live in them. They were then entitled to and embraced in the same verdict of "good."

Geologically, this seems to have been pretty well toward the end of the tertiary.

"Whatever," said the Professor, "may be the fact as to any contradiction thus far we are now coming to what seems to me a fatal one. I mean the order of these events. The completion of the land and seas is said by this account to have preceded all kinds of plants, or, in other words, there were neither plants nor animals before the completion of land and seas. Every tyro in geology knows that this is not true. There were plants and animals, too, ages upon ages before that."

Error 21. The order is wrong.

I knew the best way to meet his difficulty was to turn to the story itself, and let him see just what it says; so I took up the Bible and read aloud:

11 *And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit-tree yielding fruit after his kind, whose seed is in itself, upon the earth: and it was so.*

12 *And the earth brought forth grass, and herb yielding seed after his kind, and the tree yielding fruit, whose seed was in itself,* after his kind: and God saw that it was good.*

13 *And the evening and the morning were the third day.*

Where, I asked, does Moses say that no plants or animals preceded these?

"No; it is not said in so many words, but he speaks of no earlier ones, and that seems to me about the same thing."

* In which (fruit) is its (the tree's) seed—that is, fruit-tree whose seed is in its fruit. See Dr. Conant's *Genesis* on this verse.

But silence is not denial. All that can be justly said is that Moses speaks of certain kinds of plants as coming after the completion of the land and seas. Now, is this true? Geologists say that the last great development—the culmination of plant-life—occurred in the latter part of the tertiary. It was then that the vegetation contemporaneous with Moses, and I may add with ourselves, made its appearance. I then took up De la Saporta's *Le Monde des Plantes* and read on page 380: "The vegetable kingdom acquired its characteristic traits long before the animal had completed its own; so that, probably before the end of the tertiary, the principal groups, and even the genera that compose them, the vast majority of our actual flora, were established in the limits which they now occupy."

Plant-life did, indeed, begin millions of years earlier, but present genera began very late in geological time. The question, then, turns on this, What vegetation did the author of this story have in mind? Was it the almost structureless sea-weeds which for many ages were the only plants? Is it not beyond all reasonable doubt that he intended to speak of the vegetation in existence when the story was given? Moses knew of no other, and if, for some reason, God wished to tell of the plants which he made at the dawn of life, he knew too much to call them "grasses, herbs, and fruit-trees bearing fruit whose seed is inside of it."

Taking, then, the story to mean just what it says, the difficulty vanishes, the order is all right. But the difficulty re-appears when we leave the words of Moses, and, in order to sustain certain preconceived notions of our own, make the plants he names mean sea-weeds. What right have we to take such a liberty?

To this the Professor made no reply except that "this was not the Genesis that he had heard so much about. He had always understood that it told of the creation of all plants from the very first, and, of course, that verses 11 and 12 were meant to describe not the flora of to-day, but that in which plant-life began. If such really is the meaning it teaches serious error; this new way of taking the words to mean simply what they say seems to dispose of objections in an extraordinary and unceremonious manner. But there is," he added, "what seemed to him an error in the order of this and the next period which a moderate knowledge of vegetable chemistry would have prevented. Moses places that highly organized flora before the creation of the sun.

Error 22. The order wrong.

"We know, what he did not, that such vegetation could not exist without the sun, and yet he puts it in the third period, and the creation of the sun in the fourth—the sun after the plants! There can be no question that here is an error of great importance, showing ignorance of a vital law of plant existence."

I suggested that before condemning Moses we should see whether it was he that said the sun was made so late, or whether his words had been misunderstood and misinterpreted under the influence of a false science. As this would require too much time for the present evening we would defer it till the next. So we dropped it for the present.

OUR FOURTH EVENING.

OUR THEME: WHAT WAS DONE IN THE FOURTH PERIOD.

Genesis i, 14–19.

14 *And God said, Let there be lights in the firmament of the heaven to divide the day from the night.* 15 *And let them be for signs, and for seasons, and for days and years; and let them be for lights in the firmament of the heaven, to give light upon the earth. And it was so.*

[That is, the transaction was completed, the fiat was obeyed, and all the things commanded were done.]

16 *And God made two great lights; the greater light to rule the day, and the lesser light to rule the night: he made the stars also.* 17 *And God set them in the firmament of the heaven to give light upon the earth,* 18 *And to rule over the day and over the night, and to divide the light from the darkness: and God saw that it was good.*

19 *And the evening and the morning were the fourth day.*

THE above, except as to the division into paragraphs, is the common version. For reasons which I shall give in the course of the discussion I offer the following as nearer to the Hebrew.

Verses 14, 15. And God said: "Let the lights in the expanse of heaven divide between the day and the night; and let them be for signs, and for seasons, and for days and years; and let them be for lights in the expanse of heaven to give light upon the earth." And it was so. [The things commanded were done.]

Verses 16, 17, 18. (And God made the two great lights; the greater light to rule the day, and the lesser

light to rule the night: he made the stars also. And God set them in the expanse of heaven to give light upon the earth, and to rule over the day and over the night, and to divide between the light and the darkness.) And God saw that it was good.

Verse 19. And 'twas evening and 'twas morning, the fourth day.

It was several days before the Professor came to see me. He seemed eager to continue the discussion, for he had scarcely taken his seat before he said: "My difficulties are not yet all removed. In fact, we are coming to the greatest of all. It seems to me that Moses commits a gross error in verses 14 and 15,* where he says, 'Let there be lights in the firmament of heaven to divide,' etc. He represents the sun and moon as made after the dry land had appeared and had brought forth the very highest orders of vegetation—fruit-trees—and even after they had been pronounced completed. Or, to state the matter geologically, Moses says these luminaries were formed later at least than the cretaceous, if not after the tertiary. Now, every body knows that they had been in existence long before this, and had been shining for untold ages as brightly as now, and that all along there had been

Objection 23. Says sun and moon were made after plants.

* The reader will remember that it is the common version of which the Professor is speaking.

days and nights, and that then, as now, the earth had revolved around the sun in a little more than three hundred and sixty-five days. I cannot believe Moses inspired, or he would not have made this mistake."

As for this whole matter of the work of the fourth period, I replied, whatever it was, it involves so many questions pertaining, some to philology, but mostly to physical science, that an exhaustive consideration is at present impossible. I think, however, that the special difficulty to which you refer has no real existence.

The common version, "Let there be lights," is a creative fiat, and, if it be the only fair rendering of the Hebrew, involves the account in the difficulties of which you speak. It has been suggested as an explanation that the earth up to this time had been wrapped in persistent clouds so dense as to hide sun, moon, and stars, and that the command was directed merely to the dispersion of these clouds.

This solution of the difficulty is looked upon by many as only a make-shift, and I confess it seems so to me. For if the clouds had shut out all light there would indeed have been no days or nights or seasons; but this would leave the previous three days unaccounted for, and it does violence to the laws of such plant life as Moses describes; for seed-yielding herbs and fruit-trees require sunlight. On the other hand, if enough solar rays came through the clouds to sustain such a vegetation, then, although the sun might be invisible,

as now in a cloudy day, there would have been days and nights; and the existence of seasons would have been indicated by the varying length of the days.

And besides this, a mere breaking away of clouds, permitting the face of the sun and moon to be seen, when their light had for millions of years been pouring down in quantities amply sufficient for the needs of a most abundant and luxuriant vegetable and animal life, seems but a meager fulfillment of expectations excited by such a fiat as, Let there be lights in the firmament of heaven.

The kind of science which, to avoid difficulty, says that up to this time days and nights had no definite limits is to me so incomprehensible that I cannot deem it worthy of serious notice. If the earth's axial motion was uniform (and no one supposes it was not), and if light obeyed the same laws as at present, the "limits" of the days must have been as definite then as now.

Another theory finds favor with some who protest against applying to this account the science of the nineteenth century.* They imagine that luminous matter in the earlier days was gathered around the earth, until the fourth period, and then the sun, which

*I notice that those who protest against applying the science of the nineteenth century to this account apply it themselves, just as far as they think they can do so with safety. If it were not painful it would be amusing to see the efforts some of them make in this direction.

previously had existed as an opaque body, became luminous, and at the same time the light-giving matter left our planet and went to the sun, or in some other way was disposed of.

To this no other answer need be given than that the luminous matter owes its luminosity to its intense heat. Such a covering about the earth would have rendered life impossible.

Lastly, there are those that say the refractive power of the atmosphere was in some way so increased that the solar rays were bent to such a degree that the side of the earth away from the sun was illuminated almost as much as the side toward it. This requires no other answer than that no such refraction was possible without a change in the laws of light.

Apart from any other objection to such an explanation, it is useless for the purpose for which it was devised. It does not remove the difficulties, for it provides only for a perpetual day, while the account speaks explicitly of day and night, and of evening and morning.

With these and all similar explanations, I, for one, am dissatisfied, because they have no foundation in facts, and because, while accepting the common version, they seem to force its meaning, or, at least, to belittle its natural import beyond the limits of a fair exegesis.

Pondering long upon the words of Moses and the

facts of our world's history as I had learned them from astronomy and geology, I arrived, at last, at another explanation, which, so far as I can see, does violence to neither. The method by which I arrived at it, and the explanation itself, I will, as briefly and clearly as I can, now lay before you.

I first sought to know just what it was that Moses said. This, of course, was a question for the grammar and lexicon, and if you will follow me as I again go over the ground you will, I think, be better prepared to compare his statements with the facts in our world's history which science has made known.

Turning to my Hebrew Bible, I note the absence of any word corresponding to "there" in the sentence which is rendered, "Let there be lights," etc. The translators placed it in our version because, with the views in relation to the creation of the sun and moon which they held in common with all the world in their day, they thought Moses of course intended to say that these bodies were actually made at that late date. "Let there be lights in the firmament of heaven" can hardly be forced to mean any thing less than their creation. But if "there" be omitted, the creative sense almost disappears. It quite vanishes when we use in the English the future tense—in which the Hebrew verb really is; then it reads, "And God said, The lights in the firmament of heaven shall be for" certain offices.

This is an important change. It will help us to see the rightfulness of it if we make the same rendering in each of the other fiats—that is, if we translate in the future tense—and observe that it makes no change in their meaning. I will give each instance, keeping the exact order of the Hebrew words, except that our idiom requires the verb to be placed after its subject, while the other generally requires the opposite. We say, "In the beginning God created the heaven and the earth," while the Hebrew says, "In the beginning created God the heaven and the earth." The future tense being used, the fiats will read as follows:

"And God said, Light shall be—

"And God said, A firmament shall be—

"The waters under the heaven shall be gathered unto one place, and the dry land shall appear—

"The earth shall bring forth grass—

"The lights in the firmament of heaven shall be for—

"They shall be for signs and seasons—

"They shall be for lights—

"The water shall bring forth—

"The earth shall bring forth—"

A careful examination will show no change in the sense from the common version, except in the fourth period. You will notice in the ninth verse it reads, "And God said, Let the waters under the heaven be gathered unto one place." In the Hebrew the words

"under the heaven" follow "waters;" they qualify the latter—that is, tell what waters are meant. The same order is found in the 14th verse; it is literally, the "lights in the firmament of heaven." Hence, if we keep the order of the original, we should say, "the lights in the firmament of heaven," as I have given in the proposed version.

It appears, therefore, that the fiat was a command to bodies already in existence to do certain things, as in the third, fifth, and sixth periods.

But that is not all. There is in this verse a peculiar Hebrew idiom, the recognition of which sheds further light on the meaning of the command. Before the word rendered "to divide" there is placed the preposition *lahmed*. The lexicons say that the verb "to be," followed by *lahmed* before an infinitive, is often merely a periphrase for the simple verb. Gesenius says it forms in many places a periphrase for the future; for example, Gen. xv, 12, "When the sun was going down," or, rather, "When the sun was about to go down," or, as given in the *Catholicum Lexicon*, "*Soleil allait se coucher.*" So also Josh. xi, 5. Samuel Lee says the same. So, too, in Fuerst's Lexicon. The *Catholicum Lexicon* says *lahmed*, with the verb "to be" before the infinitive, is the same as in English "*I am to play;*" or, in French, "*Aller faire telle chose*—I am going to do a certain thing."

In accordance with this principle the fiat reads

thus: "And God said, Let the lights in the firmament of heaven henceforth divide between * the day and

* More than two years after the above was written I came across Rosenmüller's exposition of the fourteenth verse, quoted by Dr. Chalmers in his *Natural Theology*, vol. i, page 253. I give it with a slight change—not in the sense, but to make it clearer.

Speaking of this verse the great German commentator says: "If any one conversant with the genius of the Hebrew, and free from previous bias, will read the words in their natural connection, he will immediately perceive that they import a direction or determination of the heavenly bodies to certain uses. The words *yehee meoroth* are not to be rendered *fiant luminaria, let there be lights*—that is, *let lights be made;* but rather, *let lights be*—that is, *serve (inserviant)—in the expanse of heaven for distinguishing between day and night, and let them be, or serve, for signs and for seasons*, etc. For we are to observe that the word *havah*, 'to be,' in connection with the prefix *lahmed*, 'for,' is generally employed to express the direction or determination of a thing to an end, and not its production."

I interrupt the quotation to ask the reader to apply Rosenmüller's remark to cases where, as in the text, the *lahmed* is placed before a verb. In such a case the thing toward which the fiat is directed, or determined, is the verb itself; and hence, as I have pointed out, it becomes only a periphrase for the simple verb in the future.

Rosenmüller goes on: "But the difference between *yehee* and the plural *veyahee*, in the fourteenth verse, demands a corresponding difference in their translation; and, therefore, if we would make that difference apparent, we must literally interpret thus: *Fiat luminaria in firmamento cœli ad dividendum inter diem et noctem, ut sint in signa, et tempora*, etc., or, in our language, Let it be that the lights in the firmament of heaven, for dividing between the day and the night, be for signs and for seasons, etc."

It will be seen that Rosenmüller, on purely grammatical grounds, sustains fully the great point that a creative sense ought not to attach to the command in this verse. The rendering which I have given—Let the lights in the firmament of heaven divide between the day and the night, and let them be for signs, etc.—seems to me to be even closer to the Hebrew idiom, and, moreover, it requires no straining the text nor forcing the conjunction *vav* (and) into "that," as does the translation adopted by Rosenmüller.

the night." I insert the word "henceforth" to emphasize the future meaning. They are to do (*aller faire*) this thing.

If I am right in this rendering, which seems closer to the original than does the common version, your objection, that Moses puts the creation of the sun too late, vanishes, for this is not a creative fiat but merely a command to bodies already in existence to do certain things.

"To this," said the Professor, "I have two objections. Dividing between* the day and the night was nothing new; for if, as you say, there had been a sun for ages, and there had been days and nights, the sun divided between them then as much as now; hence, on your rendering, there was nothing done in response to the fiat. This seems to be absurd.

"Secondly, you place the article 'the' before the word 'lights.' You say, 'Let the lights.' The article does not occur in the Hebrew. What right have you to do that?"

With your permission I will reply to your second objection first, deferring the other until we have discussed some preliminary matters, and come to consider what it was that the lights were commanded to do.

As to my right to insert the article, I hardly expected a college professor to ask that question. I

* "Between" is the marginal reading, and is literal.

will say, then, that I have the same right to insert it, or omit it, that King James's translators had. They placed it before firmament in this very clause, and elsewhere in this chapter have inserted it where it was not, or omitted it where it was, more than fifty times. Nor is this any thing strange or unusual; it is always done when translating from one language into another. We are therefore at liberty to insert or omit it here, in harmony with the idiom of the language, and in such a manner as best to bring out that meaning which is in accordance with all the facts.

But really the presence or absence of the article proves nothing as to these bodies having been already in existence. It occurs in the first verse before "heaven" and "earth," which had not been spoken of, and which certainly had not previously existed, and in the next verse it is omitted before "Spirit," about whose previous existence there can be no question.

As to your remark that if the "lights" were not made at this time, then nothing was done in obedience to the fiat, I think that what was done was a change in the inclination of the earth's axis from being almost or quite perpendicular to the ecliptic to its present obliquity; not, please remember, a change in the position of the axis in the earth itself, thereby altering latitudes, but one which did not

affect the geographical position of the poles. Such a change would be of immense importance not only as making the sun and moon time measurers, since it introduced seasons and unequal days and nights, but it greatly increased the area of inhabitability. For if the axis were now perpendicular to the ecliptic the sun would remain all the year where it is now on the twenty-first day of March; consequently no vegetation could come to maturity, say, from the middle of the United States northward, nor anywhere in Europe save perhaps a little on the Mediterranean, nor in all Asia from the northern line of Hindustan. Substantially the same condition would exist in the southern hemisphere. Perpetual snow and ice would come down far toward this line. In such conditions snow once deposited would never melt.

The area from which the snow now never disappears is but a few millions of miles; it would then be nearly thirty millions. It would be moderate to say that one half of the present inhabitable area of our earth would have remained desolate forever.

Such an increase of obliquity deserves a special fiat, since, like the introduction of plants and animals, it cannot be accounted for by any force known to science. It, too, must be referred to the divine will.

The Professor replied, "It is easy to say such an increase took place, but to be of any value the assertion must rest on facts."

True, I replied, but we must look for the evidence, not in disturbances of the strata, but in the plant and animal life of those early times. For a change in the obliquity of the earth, if gradual, occupying, for example, a few months, would not produce any perceptible derangement of the land or water. But instead of days and nights at the poles each twelve hours long, there would be ever afterward six months of constant sunshine followed by six months of constant darkness. We should therefore look for corresponding changes in the plants and animals, and we find them.

It is a well-known fact that from the dawn of life to the middle of the tertiary, or later, organic forms in all latitudes were not only similar, but in most cases actually the same; hence we may reasonably infer, at least as to plants, since they could not migrate with changing seasons, that the life-conditions were the same from the equator to the poles.

Besides food, only temperature and light affect plants. Which is the more important it is difficult to say.

Temperature might have been modified in various ways, but it is difficult to see how it could have been made even tolerably uniform, say, in latitude 80 degrees, for example, in Spitzbergen, if the heat of the sun was wholly cut off for four months of the year, and then for another four months beat down without

cessation, as must have been the case in those days if the axis of the earth was inclined then as now.

But admitting that in some way the July heat of Spitzbergen was so modified, and the January cold so reduced, that but little difference remained*—although this seems impossible—there remains the far more difficult problem of the action of the solar rays on plants. In no way could this be affected except by a change in the axial inclination. Only a perpendicular axis could cause identity in the amount and mode of distribution of the actinic force, say in Spitzbergen and Florida. Hence, if there is any thing in the modern doctrine of the influence of environment, the floræ of high and low latitudes, if the axis was inclined 23½ degrees, should have been different. The converse is true. The identity of the floræ proves identity of life-affecting forces — hence of actinic rays; hence a perpendicular axis.†

The sameness in plants and animals of all latitudes extends past the middle of the tertiary. After the tertiary a remarkable change occurred in the climate of the world; what is called the glacial epoch set in,

* The equalizing influence of the ocean is very great, but, whatever it was, it could not prevent differences between summer and winter temperature in Spitzbergen, which, it would seem, must have been great enough to destroy the magnolias and other tender vegetation which we know abounded there in the ages of geology.

† Dana, *Manual of Geology*, says that there is no evidence of zones of climate in any of the earlier geological periods. The evidence of the absence of such zones is overwhelming.

and all high latitude regions were covered with ice and snow. Ever since that time of cold passed away there is ample evidence of changing seasons, and hence of axial obliquity.

To sum up: the sameness of plant-species before the middle of the tertiary indicates a sameness in the life-conditions incompatible with months of continuous darkness followed by months of continuous light; after the latter part of the tertiary a very remarkable change occurred; and thenceforward life-conditions were such as now exist. From the study of fossil botany we learn that the glacial epoch came after the introduction of modern plants. We can reconcile the record before and after that event only on the theory that what occurred was a great change in the inclination of the earth's axis.

"To such an increase," said the Professor, "two objections now occur to me. All the forces in the solar system affecting the position of the axis are compensative, so that any change in the obliquity would, at most, be but small (1½ degrees or so, as shown by Laplace and by Mr. Stockwell) and of comparatively brief duration. And if in some way you can get by that, Dr. Croll says that if the axis had been perpendicular to the ecliptic, the polar climate would have been in consequence less genial than at present. Certainly it can be mathematically shown that in such a case the arctic regions would receive a less number of

solar rays than they do now;* whereas, in fact, they were very much warmer. These two facts seem to me to make pretty thorough work of your theory."

It is doubtless true that no force known to science could permanently change the obliquity of the earth's axis. But this is irrelevant, for somehow and at some time the axis, which, on any purely mechanical theory of formation from nebulous matter, ought to be perpendicular to the ecliptic, is inclined $23\frac{1}{2}$ degrees.† That it once really was nearly perpendicular seems indicated, not merely by the laws of mechanics, but by the fact that the moon's axis is nearly in that position now, its obliquity being only 1 degree 30 minutes and 10 seconds, and originally their axes, on such a theory, must have been parallel.

The burden of proof lies on those who, claiming a merely mechanical system evolved from nebulous matter by physical law, deny a change of obliquity. However great the difficulty of showing a sufficient cause for the change, it does not concern him who attempts to explain this account. I have now to do

*There can, I think, be no doubt that Dr. Croll is right in this. See Meech's paper "On the Relative Intensity of Heat and Light of the Sun at Different Latitudes," in the *Smithsonian Contributions to Knowledge.*

†There are many facts which no force known to science can explain. There is the existence of matter, of force, of plants, of animals, of mind. All these, like the increase of the earth's obliquity, can be explained only by considering them as the result of a divine volition.

only with the fact, patent to all, that at some time the earth's axis became inclined 23½ degrees, and, if possible, to discover when it occurred—a question of dates only. You will, of course, admit that up to that time, whenever it was, there was no alternation of seasons, and that the days in all latitudes were of equal length, being every-where twelve hours long.* Consequently, if in some way sufficient warmth was supplied in high latitudes we should justly expect to find similar, and even identical, species of plants flourishing every-where. But after that great event there would be, in Spitzbergen and on that parallel from that time onward, winter nights and summer days four months long, while in Florida days and nights would scarcely change at all. In high latitudes all plants adapted to the previous conditions would die out, and in their places would arise new species fitted for the different state of things;† while in low latitudes the vegetation would be unaffected, and the same plants might be expected to continue to the present day.

It is wonderful how this agrees with the world's actual history. In the ages before a certain time—

*If the earth's axis was then inclined the same as the moon's is now, there was a very small variation in the length of the days, but too small to admit of any climatic or actinic value whatever.

† Present arctic plants are wholly different from those of, for example, the Miocene. The change of climate in those regions was followed by "a new set of plants whose seeds had never been there or in that neighborhood," nor, I may add, anywhere else.

the glacial epoch—the same plants grew in Spitzbergen and in Florida. To-day not one of those species lives within many hundred miles of Spitzbergen or other arctic regions, where they once flourished, as Lyell says, "with the greatest luxuriance;" while their descendants are yet found in Florida and similar localities.

"However true," said the Professor, "this may all be —and I must confess it is based on well-established facts —yet unless you can dispose of my other objection your argument is thrown away. A perpendicular axis which made the polar climate less genial than at present would seem to be disproved by the very fact which you deem so important, namely, that warm-climate plants did actually grow far beyond the arctic circle."

It is true that a smaller number of solar rays than at present would be received during the year at the poles if the axis were perpendicular. But the conclusion which Dr. Croll draws from this fact—that the climate would be less genial—will hold good only on condition that temperature is proportional to the number of rays received. This is by no means the case. Proof abounds.

High lands are cooler than low lands. Yet, on equal surfaces, the former receive as many or more solar rays than the latter. So, too, men in a balloon have almost perished with cold while people on the ground beneath them have been oppressed with heat. Temperature depends far more upon the amount of heat retained than upon the amount received; and,

therefore, if it could be shown that in those earlier days the heat in high latitudes was in some way retained, the mild temperature would be accounted for, and your objection would fall to the ground. You have doubtless read Professor Tyndall's beautiful experiments on the absorbing power of gases and vapors in his *Heat Considered as a Mode of Motion.* He has shown that carbonic acid and aqueous vapor, as well as many other gases and vapors, have the power of permitting solar heat to pass to the earth's surface while retaining the heat from the latter, just as the glass in a green-house permits the solar rays to enter, but does not allow those radiated from the interior to escape. In this law is found, I think, the solution of the mystery of the warm arctic temperature. The atmosphere in those days was rich in carbonic acid and aqueous vapor; and hence, like a warm blanket covering the earth, retained the heat which the surface received.*

* Some geologists deny the existence of any such greater amount of carbonic acid than is now found in the atmosphere, because it would, as they think, have rendered life impossible, and we know that life was abundant. Without going at any length into the discussion I will only quote the words of Professor Ira Remsen, of Johns Hopkins University, in *Popular Science Monthly*, page 218, 1879: "It has long since been proved, beyond possibility of doubt, that the amount of this gas, when mixed with pure air, may be increased to one twentieth of the volume of the air"—more than one hundred and fifty times its present proportion—"without producing any serious effect upon those who breathe the air thus contaminated."

This would be ample to give the "warm blanket" required.

For these and for other reasons which I have set forth in full elsewhere * it appears to me that a perpendicular axis with an atmosphere rich in carbonic acid and aqueous vapor would account for the uniformity in life-conditions which characterized those early times.

"It would seem so; but there is a fact in geology which appears to prove that long before the glacial epoch there were summers and winters, and hence the earth's axis must have inclined as at present. Exogenous trees flourished and formed growth-rings, I do not know how far back, but many thousand years before the glacial time. Now, every body supposes that those rings mark the growth in summer and the rest in winter. If so, then your case fails."

That is the belief of botanists; but it is only a belief, and is not founded on facts. I have had occasion to examine into the connection between these growth-rings and the seasons, and have embodied my conclusions, with the facts on which they rest, in an article entitled, "Is the Existence of Growth-Rings in the Early Exogenous Plants Proof of Alternating Seasons?" (*American Journal of Science*, 1878, Art. xlv.) I there showed that many exogens between the tropics, where there is no cold season, form such rings.

* "The Three Climates of Geology," *Penn Monthly* for June, July, and August, 1880; also, "Geological Climates," in *Popular Science Monthly* for July, 1886.

"But they have wet and dry seasons which produce the same effect as a change from hot to cold. And these wet and dry seasons depend on the inclination of the earth's axis."

At first I thought as you do, but I soon found other facts. The mangrove, a tropical tree growing in the edge of the sea, and constantly washed by its waves, forms these rings as regularly and distinctly as does the oak or pine. In this case there is no possible influence arising from the inclination of the earth's axis. I observed, also, that orange and lemon trees form annual rings, although, being in this climate kept in green-houses, they do not feel the change of seasons; and that cycads form rings only once in two or three years, while at least one plant (the *Chenopodium album*) forms many rings—in one case which I have seen, fourteen—in a single summer. And lastly, to show how purely accidental is the connection between seasons and rings, certain exogens growing even in this latitude form none.

These facts prove that growth-rings would have been formed whether there were seasons or not, being due to certain cycles of growth and rest, implanted in the nature of plants.*

* Those who wish to see what geologists say about ancient climates and the distribution of plants and animals may read the following from Dana's *Manual of Geology*, revised edition, page 181: "There is wanting all evidence of a diversity of zones of climate over the earth's surface" in the lower Silurian. Page 209: "No proof" of the same

The more I reflect upon this matter the clearer grows my conviction that an increase in the obliquity of the axis did occur at or near the end of the tertiary. But if I am mistaken, then what Moses says in verses 14 and 15 merely waits for its explanation until our knowledge becomes more nearly perfect, and we must content ourselves with the suggestive fact that between the production of present plants and that of present water vertebrates and birds there did really occur a most remarkable climatic change. Without further discussion I shall for the present assume that the axis of the earth did increase its obliquity from some small angle—probably $1\frac{1}{2}$ degrees—to $23\frac{1}{2}$ degrees, and on this, as a real, or if you please assumed, fact, continue my exposition of these verses. But it will be better to wait until another evening, as we shall not be able to finish the consideration of this period in one and perhaps not in two evenings.

After a little talk we fixed upon the next Wednesday evening for our purpose, and so we adjourned.

"in the Trenton period as far as yet studied." "The mild temperature of the arctic region is evident." Page 266: "The identity of species between arctic lands and Europe and America favors an approximate identity of character; and there is no sufficient evidence of any cold arctic or any wide diversity of zone" in the early Devonian. I might multiply such quotations indefinitely. Those who would look further may turn to pages 352, 587, 321, 403, 497, 514, 515, etc. As to continental elevation and completion, see pages 524, 525, 526, etc. In fact, all the book, in reference to climate, plant-life, and animals, bears evidence to the truth of what I have been saying.

OUR FIFTH EVENING.

THE FOURTH PERIOD CONTINUED.

After the usual greetings, the Professor asked me to go on with my exposition. He held a copy of the Bible in his hand, and at my request read aloud the verses relating to the work of the fourth period.

The "lights," I began, were commanded to divide between the day and the night; they were to be for signs and for seasons and for days and years, and were to give light upon the earth—three important offices.

As to the first, how or what were they to divide between the day and the night? Certainly they were not to divide in the sense of separating the day from the night. That, according to the fourth verse, was done in the first period. And, besides, such a meaning is, in the nature of the case, inapplicable to luminous bodies. Nor do these lights serve to distinguish between the day and the night, as, if otherwise, we might mistake the one for the other. Either of these meanings would be absurd, and hence I conclude that neither was intended.

It is common to use the word "divide" in the sense of allotting or meting out, as when we say a father divides his property among his sons. If divide

be taken in this sense, then the meaning is: Let the lights in the firmament of heaven divide the time of a diurnal revolution between the day and the night; that is, let them allot to each its length.

To divide is also used in the sense of making a difference. For example, in Lev. xi, 46, 47, we read, "This is the law of the beasts, . . . to make a difference between clean and unclean." The lights in the firmament of heaven were henceforth to "make a difference" between the day and the night. Nothing is intimated as to what the difference was to be. Evidently it does not refer to the day being light and the night dark, for, in the fifth verse, the writer had already said that the light was called day and the darkness was called night. The only other difference is that which now exists, namely, a difference in length. In that sense his words become fairly luminous in view of the fact that till after the modern flora had made its appearance—that is, after the third Mosaic period—the days and nights had been equal all through the year, but that ever since the increase in the obliquity of the earth's axis there has been unceasing variation in their length as the sun journeys north and south. As to the moon, there is even more variation in the time it lights the night.

"If," said the Professor, "such an increase of inclination did really occur, its effects would be such as you have said, for while it would not affect in the

least the length of a diurnal revolution it would the length of the days and nights. But how were the 'lights' to be for signs?"

It may be that by "signs" Moses had reference to the means of determining the times of the Jewish festivals, which, as you know, were governed by the full moon in connection with the vernal equinox; or perhaps, in a broader and, as it seems to me, a better sense, the lights were to be for signs by which to measure time in general. If the earth's axis had remained perpendicular there would have been nothing to distinguish one full moon from another—no fixed point to count from—since there would have been neither spring nor other season. And, even if it was inclined a little—say $1\frac{1}{2}$ degrees—the change of seasons would have been so small as to have been imperceptible, and hence of no use as a time measure. For the same reason the year would never have become a common measure of time; for without alternating seasons there would have been nothing to suggest it, except to astronomers. There was, therefore, great propriety in speaking of the lights being for signs and for seasons and for days and years, as, in an important sense, a new office for these bodies.

"But," said the Professor, "are you not giving that word 'season' a sense which does not properly belong to it? Do we not read elsewhere that the moon is appointed for seasons?

Objection 24.

and, if so, how can the word mean what we now call seasons?"

The Hebrew word is very like its English synonym. It has reference to seasons of all kinds—seasons for sowing, seasons for reaping, seasons for religious ceremonies, etc. All these, so far as they are a measure of time, are established by the obliquity of the earth's axis, or, in other words, they count from the vernal equinox, without which they either would not exist at all or else would have no fixed point from which to be computed. Seasons, therefore, even when the psalmist says the "moon was appointed for seasons" (Psa. cxiv, 19), were directly or indirectly dependent upon the inclination of the earth's axis.

But now I wish to call attention to what seems an inexplicable omission on any theory other than that which attributes to the author of this account a knowledge of the true relation of the sun and moon to the earth. He speaks of seasons, days, and years, but of months—next to days by far the most natural division of time—he says nothing whatever; nor of weeks, the institution of which was to the Hebrews, and to Moses above all others, since he was the lawgiver of his nation, a matter of the greatest importance.* They had a word clearly and unmistakably

* It is interesting as showing the lack of real agreement between the Bible and the "Chaldean Genesis" to observe that in the latter months are the measurement of time by far the most prominently mentioned.

meaning the time of a lunar revolution—a lunar month—yet Moses omits it. Think you it was by accident that he named each division of time in any way related to the position of the earth's axis, or *affected directly or indirectly* by an increase of its inclination, and omitted the others? If, on the other hand, the axis did really at this time become more oblique, and if the author of this narrative knew it, he could not do otherwise, since the omission of months and weeks was as necessary to the accuracy of his account as the mention of seasons.*

"This," said the Professor, "is remarkable, and, so far as I can see, unaccountable on any ordinary theory, although reasonable enough if the author of this chapter had actual knowledge of the earth's axis having then become oblique.

* Of course, an oblique axis was absolutely necessary for the existence of seasons, and for those "signs" which measure from the vernal equinox, and it very seriously affects days, since it causes them to be long in summer and short in winter. But it neither caused the year to exist nor does it affect its length. Yet the obliquity is important. Otherwise the year would have come and gone as unnoticed as the precession of the equinoxes. In harmony with this difference in the relation of that great event to these measures of time it happened (?) that, in the fiat, the preposition "for," which, in accordance with the Hebrew idiom, should be repeated before each noun, is omitted before years. "And let them be for signs and for seasons, and for days and years."

Perhaps even to mention this is attaching too much importance to what most will think an accidental omission. But this whole chapter is so curious, so big with truth, that it is not safe to omit a close scrutiny of any thing in it.

"But how about the third office which these lights were to perform? It seems to me somewhat unreasonable if this is a series of absolutely phenomenal descriptions, that the 'lights in the firmament of heaven,' which you as well as all scientists believe had been shining on our globe for countless ages, should, at so late a period as the close of the tertiary, be appointed to give light upon the earth."

I do not venture to hope that I can solve every problem. Ability fully to comprehend this narrative implies a complete knowledge of our world's early history. Of all its statements those in relation to the fourth period are the most difficult, because so little is yet known of what happened in that great stretch of time to which it refers.

The fiat was a command to these bodies to do certain new things, or, if you please, to discharge certain new offices. It may also have been a command to continue certain old offices. As, if one were giving a new charter to an old city, he would naturally mention the privileges which were to continue as well as the new ones. I would say, therefore, that I see in this command an enumeration of old duties in connection with the new ones, in order that no one might claim for these bodies exemption in any particular from God's control.

This seems to me the most probable explanation of what Moses says. Whether the belief that a dense

cloud-envelope formed as the cold of the glacial period came on, and the fiat was directed to its removal, as some have thought, has any foundation in fact, is very doubtful. For myself I prefer the explanation which I have given.

"This whole matter," said the Professor, "is very curious. It is strange that Moses, with his Hebrew notions of the importance of Sabbaths and months, says nothing of either when speaking of the measures of time. And it certainly is very remarkable that he places the statement that the lights were to be for seasons just where he does—that is, after fruit-trees, and before *living* species of animals, for the glacial period comes in that interval, and it was the pivotal period between the uniform climate of the earlier world and the wonderfully varied climate of the present day. The conclusions are too startling. They bewilder me. I must take time to consider them. But I find great difficulty in the next two verses. To me they seem to contradict your explanation of the fourteenth verse. The writer says, 'And God made the * two great lights; the greater light to rule the day, and the lesser light to rule the night: he made the stars also;' and so on through the next verse. I have always been told that this verse has reference to the actual creation of those bodies; and since it is

* The article is omitted in our version, but it is found in the Hebrew.

placed in the fourth period it is fair to suppose that Moses himself believed that they were formed after the things mentioned in the earlier periods, as, for example, after the grass and the herbs yielding seed, and after the fruit-trees. But the fossils tell us that the sun had been shining for untold ages before there were any fruit-trees. So far as I can see this is a contradiction of the record of the rocks; or, if in some way you throw this verse back to an earlier date, does not that destroy the chronological order which you claim for this story? God undoubtedly made the sun, moon, and stars at some time, but not at so late a period as Moses says he did."

Objection 24a. About the order.

We set out, I replied, when we began this discussion, with the theory that Moses means just exactly what he says. Our adherence to this has caused many seemingly formidable difficulties to disappear. We must still hold to it. Hence when, after the command to the lights to divide between the day and the night, and to be for signs, and for seasons, and for days and years, Moses adds, "and it was so"—that is, the fiat was obeyed—we are stopped from saying that he thought, or that he wished his hearers to think, that the bodies whose obedience was recorded in that phrase were made *afterward*—that is, made after they had done as they had been commanded. Moreover, he had previously told of days and nights and

mornings and evenings. How could he possibly have dreamed of saying that the sun was made after all that? To believe this requires not only ignorance of our world's history, and a ready power of misconception, but also the assumption that the author of the narrative used words with such looseness as to mean little or nothing.

"Those verses are in the account; they mean something; what is it? why are they there?"

I see in them only a parenthetical statement to guard against the tendency of the Hebrews to worship the heavenly bodies, which was exceedingly strong. After recording the command and its fulfillment—"and it was so"—an act of mastership merely—Moses claims infinitely higher rank for his God, and forever denies the self-existence of these bodies by adding the all-important statement that he made them, and set them in the firmament to give light upon the earth and to rule over the day and night, and to divide between the light and darkness. That is, God made those bodies, and made them on purpose to perform the very offices which the Hebrews daily saw them filling. Supremacy could go no further; and the writer adds, in order that no one of the heavenly bodies should be deemed independent of God, "he made the stars also." Hence, in reference to all these luminaries, the sun in its might, the moon in its silver radiance, and the stars in their mysterious beauty—

the gods of the surrounding nations—Elohim is not set forth as first among equals, but infinitely higher.

"But," said the Professor, "are you not attaching too much importance to the words 'and it was so?' We read, 'Let the earth bring forth grass, herbs, and fruit-trees,' followed by those same words, 'and it was so;' and yet in the very next verse we read, 'And the earth brought forth grass, and herbs, and fruit-trees.' After those words, which indicate the earth's obedience to the command, we read that it did the very thing which, if your exegesis is correct, it had already done. Is this not fatal to the conclusion which you draw?"

Objection 25.

No, I said, the cases are not parallel. It is a fact that the earth brought forth grasses, herbs, and fruit-trees in obedience to the command, and from that time onward it went on bringing them forth. The command caused them to come into existence, and they continue to the present day to be brought forth. As to the sun and moon the case is very different. Had Moses, after announcing their obedience to the command, said that they continue to be for signs and for seasons, and for days and for years, no one could have objected. Instead of that he records the command, and that it was so done, and then adds the great fact that God made the sun, moon, and stars, and placed them on high.

"I do not know that I can justly object to this;

nor am I prepared to fully accept it. It is so contrary to all my notions of this account, so different from all the explanations of commentators and others, that it needs careful study before accepting it, and I fear, even if you are right, that it will be long before the world accepts it.

"But, however that may be, you have not replied to my question, which I will repeat. If it can be made out that verses 16, 17, and 18 refer to an earlier period than, say, for example, that in which fruit-trees appeared, does it not destroy that chronological order to which you attach so much importance?" Objection 26.

I think not. The account says, "Let the lights in the firmament of heaven divide;" and the fulfillment of the command is set forth in the assertion that "it was so." Then comes a parenthetical remark of great importance, not, it is true, in chronological order, but so guarded that error is unnecessary. The writer, after recording their obedience, says, "And God made the two great lights; . . . he made the stars also, and placed them in the firmament" for certain purposes; and then the story, momentarily interrupted, moves on to the creation of certain animals, the creative act next in order, not to the *creation* of the lights, but to their *appointment* to divide between the day and the night, and to be for signs and for seasons.

To make the matter clearer, if that be possible, let me illustrate. In some brief history of the United States I find what purports to be a list of presidents. I read something like this:

George Washington,
John Adams,
Thomas Jefferson,
James Madison,
James Monroe,
John Quincy Adams,
Andrew Jackson;

son of a Scotch-Irishman who died before the birth of his illustrious son;

Martin Van Buren, etc.

Now, what would be thought of a critic who should seriously propose to reject this list as chronologically false because, after Jackson's name as president, a circumstance is mentioned which occurred long before the election of his predecessors to that high office? If he should insist that the writer has violated the chronological order we should justly laugh at him; and, if we deemed it worth while to waste any words on him, would reply that the writer of the list had seen fit to put into it an interesting fact about whose chronological position there could, in the nature of the case, be no mistake.

So in regard to these verses; the author, after speaking of these days and nights, and of the repeated

occurrence of evenings and mornings, and of the obedience of the "lights" to the divine fiat, put into his narrative a statement equally out of its order, but one about which there ought to have been no mistake. But readers and expounders were not content with the story as written. They tried to force out of it corroboration of their so-called science. Such efforts, based upon no knowledge of the actual history of our globe, resulted in a muddle from which the Christian world is yet far from having escaped.

"But, after all, is it conceivable that God put upon record an account which was liable to mislead men in their unavoidable ignorance? Would he not, if he had indited the narrative, have told them plainly that the creation of the sun and moon long preceded the fourth period?" Objection 27.

This is outside of the limits which we laid down for ourselves, since it does not concern the truth of the statements themselves, but refers only to what God, if the author, would or would not have done. Of that, I submit, we are not the proper judges. This much, however, is forced upon us as we look upon the works of creation. Every-where we find mysteries—even seeming contradictions—which yield only to close study and increased knowledge. This is one of the most marked characteristics of what all admit to be God's works. The earth seems to be flat; all the world, "in their then unavoidable ignorance,"

thought it was flat, were sure it was flat, knew it was flat; but it was not. The stars long seemed mere points of light infinitely smaller than the sun, but they are not. Now, if paradoxes and puzzles are so abundantly found in the book written by God's finger in the universe about us, and if men "in their unavoidable ignorance" were so misled, I see no reason why this account, if from the same source, should be free from similar difficulties. Indeed, their absence would seem to indicate another author.

We are told in Proverbs that "it is the glory of God to conceal a matter." * It is worth while to remark that the statements here are plain enough, and convey only a truthful meaning until they were put upon the rack of a false philosophy. Conclusions so arrived at are of necessity false.

I will only add that the more our knowledge of the world's past history increases, and the more carefully and patiently we examine this account in the docile spirit of true philosophy, the less the difficulties appear. Such, at least, has been my own experience.

"I am willing to admit the remarkable character of this account," replied the professor, "and that what I have been accustomed to consider fatal objections seem

* It is a very interesting question, How much could one ignorant of science and free from theories have learned from this account? I shall endeavor, by and by, to answer the inquiry.

to vanish in the light of modern science, and that in some cases they re-appear as harmonies instead of contradictions, while in others they have no existence in the narrative itself, but are additions of a comparatively recent date. It certainly is a very different document from what I had been led to believe.

"But, admitting all that you claim, it follows that if the author of this account did not intend to say that the sun and moon were made during that fourth period he has given them no place whatever in the order of creation. While other things far less noteworthy were recorded in their proper places the sun and moon are allowed to slip in on the creative stage unnoticed and unchronicled." Objection 28.

It is true the writer says God made the sun and moon, but says nothing of the place of that event in the creative order, or rather, I should say, of those events, for they were separated by a long interval.* We now know that they were formed long before God divided between the light and the darkness. Any man, unprepossessed by theories, reading this story, might have inferred that the sun long preceded the fourth period, in which it is first spoken of. The mention of day and night, the three evenings and mornings, the command to "lights in the firma-

* That they seem in the story to be near together is no more remarkable than that God's other work makes them seem to be of the same size and distance.

ment of heaven," the explicit statement that they had obeyed God's command before speaking of God's having made them, ought, even before modern science, to have prevented mistake. But to those who read this account with the advantage of knowing something of the early history of the sun and earth it is fairly luminous. That people did misunderstand is no more to be wondered at than that they misunderstood the size and distance of the heavenly bodies.

But you may say the fact remains that if the making of the two great lights did not occur in the fourth period it has no place in the narrative. Well, what if their creation has no place in the creative order? What then? I do not see how that affects the questions which we are discussing. We agreed to keep strictly to this: Are the statements in that account true, and are they placed in the proper order? We have nothing to do with omissions.

We have not the right to say what should or should not have been inserted. That was a question to be decided by the author according to his views of propriety. If we think our views are better than his it is merely a question as to his good judgment, and does not in the least affect his truthfulness.

To this the Professor made no reply, but merely said: "We have had enough for one evening. We will adjourn till to-morrow night."

A gleaner, going over the ground which we have just passed, was struck by the singular circumstance that dividing between the day and the night has a fiat all to itself and in the most conspicuous place, while signs and seasons, days and years, are all lumped into one command, and asks why? It was thousands of years after Moses before the curious fact was known that the varying length of the day and night was the first and most striking evidence of an increase in the obliquity of the earth's axis, *the* thing that was necessary before the lights in the firmament of heaven could be for signs, and for seasons, and for days and years.

I found no argument on this, but speak of it to show the drift of every thing in the narrative toward some near harmony with the earth's history. Its author *must* have known all about it.

OUR SIXTH EVENING.

OUR EARTH'S RANK IN THE UNIVERSE.

THE following evening was too stormy for the Professor to venture out, but the next evening he was promptly on hand. We at once took up the thread of our last conversation.

"At least in one respect," said he, "I think you must admit that Moses was in error, for he shows a great, but I must admit very natural, ignorance as to the relative size and importance of the earth and heavenly bodies. He thought that the former was the center of the universe, and that the sun and moon were less than it, but greater than the stars. I need not say that modern science has reversed all that."

Objection 29.

This is an old charge, I replied, so often repeated that many believe Moses really says so. But it is only one example of the injustice with which this account has been treated, and requires no other reply than that which I have so often made before: "Moses does not say so." If I am mistaken take the book and show where it says (1) the world is the center of the universe; or, (2) the sun and moon are less than the earth; or, (3) larger than the stars.

[He first reads verses 14–19.] "I must admit that Moses does not give these three propositions in so many words; but he does say that God made and set the two lights in the heavens to give light upon the earth, and, moreover, he expressly calls them great lights, and never intimates that the stars are more than specks of light."

Well, is it not true? Did not God make them all? Did he not set them in the heavens? Do they not give light upon the earth? Are there not two great lights? Certainly, all this may be, and is true, without a word as to their size.

"It is strange how you get away from difficulties. Yes, it is true that they are 'for lights to give light upon the earth,' but surely that is not their only use."

Objection 30. "Moses says sun and moon were made merely to give light to the earth."

Moses nowhere says it is. I see in the account merely a statement that they were to be for lights to give light upon the earth, and that God made them and put them in the heavens to give light upon the earth; and, whatever their other uses, you cannot deny that this is one, nor that it was purposed in the divine mind, unless you think God did not know the result of his own acts.

As to the relative size of sun, moon, and stars, I see no intimation whatever. It speaks of the sun as the greater light, and of the moon as the lesser light,

and that is all. In that I see no error. It was true then, and it is true now.

Nothing is said about the stars except that God made them also. Within the last few years the spectroscope has confirmed this by showing that they are composed of the same materials as the sun, and we know from astronomers that they are subject to the same laws of gravitation.

"Yes," the Professor answered, "but Moses says the greater light was made to rule the day and the lesser light to rule the night. Certainly this implies inferiority to the earth, whose days and nights are deemed of sufficient importance to be thus honored."

Whether it does or not, it certainly does not imply any thing as to size. But it is not with Moses that you are contending, but with Nature. The sun does rule the day. As its northern declination increases, or decreases, so do the days. The moon, too, shines longer in the nights as the sun goes southward, and gives greater relief to the hours of darkness in the long nights of winter. Is it not true, then, that the greater light rules the day, and the lesser light the night? And will you venture to say that this was not foreseen by their Creator? No! These statements, taken without addition or diminution, are true.

"It is amazing how objections vanish by so simple a process as comparing them with the record itself. I know nothing like it."

If I read the book of nature aright, no beings resembling any of whom we have any knowledge, or of whom we can even conceive, exist now or could by any possibility have existed in the past on the sun or any of the planets or moons of the solar system.

The sun is inconceivably hot, an ocean of fire whose waves rise and fall, not a few feet, but thousands of miles. On it are in constant operation whirlwinds and currents rushing thousands of miles in a minute, not horizontally only, but upward and downward. The pretty belief was once prevalent that clouds of enormous thickness protected the surface of an interior globe from the intense heat of a luminous and fiery envelope, and that thus shielded there was a world of light and beauty inhabited by intelligent beings. But this was poetry, not science, and no astronomer now accepts it.*

The planet Mercury is hot enough to melt lead.

Venus has, during its day, a temperature above that of boiling water, and from the great inclination of its axis (49 degrees, 51 minutes) its polar circles

* This theory was suggested by Wilson, but is generally attributed to the elder Herschel.

"The discovery of the conservation of force, and the convertibility of heat and force, was fatal to this theory. Such a sun as that of Herschel would have cooled off entirely in a few days, and then we should receive neither light nor heat from it."—Professor Newcomb, *Popular Astronomy.*

and tropics overlap, so that its climate must be the most extraordinary imaginable.

Mars seems the most like an inhabitable planet, possessing, as it does, both air and water, but it resembles the earth in some of its earlier geological periods rather than at the present time. It seems destitute of vegetation, for although it has well-marked seasons, and the snow can be seen melting away, there are no such changes in the color of its land as would indicate the coming and going of plant life.

As for the asteroids, no one thinks them inhabited. The indications are very strong that Jupiter, Saturn, Uranus, and Neptune are yet in an intensely hot and probably molten condition.*

As to the planets, very few can now be found who regard any of them as inhabitable by beings of whom we can conceive, but there are some who think it at least possible that the moons of Jupiter, and perhaps of the other outer planets, could support beings like ourselves. We know so little of these bodies that any opinion can be but the merest conjecture except as to one thing. The two largest ones must be subjected to great extremes of cold, since the night of the one is eighty-six hours long, and of the other two hundred, or more than eight days such as ours. In the

* Newcomb's *Popular Astronomy*, pp. 516, 519, brushes away the once common belief that other worlds are inhabited.

case of the more remote planets the conditions on their moons are yet more unfavorable for either plants or animals.

There remains only our moon. Science shows it has neither air nor water. And if that is not enough to prove it uninhabitable, astronomers have found that its temperature varies far beyond the possible limits of endurance.

"Although no one believes the moon now inhabited, yet not a few think it did once support a teeming population, the air and water having been absorbed into the interstices of the crust, or of the rocks that form it."

As Professor Huxley says, "We will, if you please, test this view in the light of facts."

Ever since the moon became cool enough to be covered with a crust, and of course long before the period of supposed life, its days and nights have been essentially as they are now, nearly three hundred and forty hours of uninterrupted sunshine, followed by a night of equal length. Even if the moon had possessed an atmosphere as dense as that of the earth—scarcely possible with its so much smaller mass—a sun shining for two weeks, and a night for an equal time, would have produced extremes of heat and cold fatal to beings of flesh and blood.

"I do not know about that. Man has wonderful ability to resist changes of temperature. I think that might have been got along with, provid-

ing the moon really possessed an atmosphere and oceans."

The present condition of the moon's surface seems to be proof that it never had any water, at least not any large amount, as would be needed to fill an ocean. It presents an inconceivable roughness. There is nothing on the earth, except in some very limited and recent volcanic regions, to compare with it. Now, when we consider the eroding power of water and frost, as we see their effects here on our own planet in the cutting and carving of mountains,* and then reflect that the moon has been a solid body at least as long as the earth (many times longer, according to most believers in the nebular hypothesis), and during all that infinitude of time has experienced not one winter to each of our years, but thirteen; that the cold is not equaled outside of our arctic regions, it seems impossible that the moon's surface, had there been an atmosphere and oceans on it, would to-day present any thing more than the gentlest undulations. The wonderful roughness, so visible in every telescope, has been subjected to no such influence; hence I find myself forced to conclude that neither air nor water in large quantities ever existed there, and that life was always an impossibility.

* This is so well known to geologists as to require no proof. But the non-geological reader will do well to turn to Dana's *Manual of Geology*, page 635. He will be amazed to see what has been done by the action of water.

"What," asked the Professor, "has this to do with the Mosaic account?"

More, probably, than you imagine. You have found fault with Moses because, as you say, he gives undue importance to our earth. Now, omitting spiritual beings—whom your barometrics* does not recognize—of what use are the sun and moon, except to our earth? Mind, I do not say they are of no other use; I ask you to tell of some other, and what it is. Of course, I know that the sun holds the planets in their orbits; but that office is only subordinate to the purpose, whatever it was, for which the solar system was formed, and has nothing to do with the moon. She does not hold any bodies in their places.

"It seems very absurd to conceive of the sun's being made for this little earth. Your question implies a return to the old astronomy, which taught that the earth was immovable and that the universe went around it." Objection 31.

"And the universe went around it!" I have not intimated such a belief, nor do I see any thing in this narrative which points that way. I see only a statement that God made these bodies to give light upon the earth, and to be for time-measures; and these very things I see them do. That God purposed these

*Barometrics: *baros*, weight, and *metron*, a measure; that division of science which has to do only with what can be weighed in grains, or tons, or measured in inches.

results when he made these bodies I must believe or consider him ignorant of the results to flow from his own actions.

As to the absurdity of which you speak, I cannot see it. I have in mind an illustration of what has been done for our earth that may have no weight with you, but to me is of infinite importance. I have it on evidence which to me is demonstration, that He who made all things, and by whom all things consist, actually lived some thirty-three years on this globe in a human form. The greater includes the less, and, believing this, I can easily believe that he made the sun and moon for man.

It is worth noting that the men who think it absurd and belittling that God should do so much for man regard all final causes as absurd. In other words, it belittles God to think that he made these lights for so small a purpose as the use and benefit of our race; but it is not absurd to suppose he made them for no purpose at all! Making them for man, forsooth, is belittling; making them for nothing whatever is in character with a god, an apt illustration of that unconscious intelligence which some would have us believe made the world.

Such a god would be worthy of an agnostic, for such a being would be unknowable and inconceivable.

But you have not answered my question, and I wait with some curiosity for you to tell me of some other

use for which these bodies were made. I submit that "for his pleasure" does not answer my question. It is merely a child's answer, "I did it because I had a mind to," and answers nothing.

"I must confess that I cannot conceive of any use other than that of which you have spoken, although, perhaps, some one else may. Until I have further light I am content to give up what I have always supposed a real and important objection; and if you are willing I am ready to take up the next period."

As it was late we thought it best to defer the discussion of the next period to another evening.

OUR SEVENTH EVENING.

THE ANIMALS.

Genesis i, 20–25.

20 *And God said, Let the waters bring forth abundantly the moving creature that hath life, and fowl that may fly above the earth in the open firmament of heaven.*

21 *And God created great whales, and every living creature that moveth, which the waters brought forth abundantly, after their kind, and every winged fowl after his kind: and God saw that it was good.*

22 *And God blessed them, saying, Be fruitful, and multiply, and fill the waters in the seas, and let fowl multiply in the earth.*

23 *And the evening and the morning were the fifth day.*

24 *And God said, Let the earth bring forth the living creature after his kind, cattle, and creeping thing, and beast of the earth after his kind: and it was so.*

25 *And God made the beast of the earth after his kind, and cattle after their kind, and every thing that creepeth upon the earth after his kind: and God saw that it was good.*

THE Professor read these verses aloud, and then said: "This account of the creation of animals has been thought the most vulnerable portion of the narrative. It is said that Moses here teaches that there were no animals before whales, or at least some kind of water vertebrates, and birds, and no land creatures before cattle, beasts, and other living species. Of course, every tyro in geology knows better. I think, from what you said when speaking of the third period, that your view is very different."

Error 32. "No animals before present kinds."

Yes, it is different. It seems to me that all conflict between this account and science comes from people's interpolating their own notions of what Moses ought to say, and assuming that he intended to teach not what he actually says, but what they think he ought to say.

In regard to life, and as to the order of the different kinds of organic forms, this is all that the record says: The earth brought forth grass, herbs, and fruit-trees. Afterward, the waters swarmed with the living moving creatures and great whales, and fowls flew in the air. Yet later the land produced cattle, beasts, and other living creatures. Or, in briefest form:

1. Silence as to any prior life, plant or animal.
2. Present plants.
3. Whales and other water animals yet living, and modern birds.
4. Cattle, beasts, and other land animals of living kinds.

In geological parlance, he speaks only of the last three "horizons" out of the many which are now known to have existed. Is his order correct? I have already quoted De la Saporta as saying, "Before the end of the tertiary the immense majority of our actual floræ were established in the limits which they now occupy."

Professor Dana, in his *Manual of Geology*, third edition, page 518, says that "all the fishes, reptiles,

birds, and mammals of the tertiary and earlier times are now extinct." Hence, "living" kinds came after the tertiary, and consequently after the present flora.

In the next period, the quaternary, are found the very fauna that Moses mentions, to wit, whales and other water vertebrates and birds, and these, too, of living species; or, as Professor Nicholson says, in his *Life History of the Earth*, page 345: "No extinct species of fishes, amphibians, or reptiles of the quaternary have been found." He says the birds too, so far as found, are all of living species except a few kinds—the moas and other wingless birds—and of these probably all became extinct within a few centuries.

"The mammals of this period, with few exceptions, are extinct." * Le Conte, in his *Geology*, page 569, says: "In the quaternary came a new set of mammals, which also have disappeared; and lastly came present species, the living mammals of to-day"—just exactly as Moses says. So then, as far as I can see, if these high authorities are right the order in which Moses has placed his three "horizons" is correct.

"Then," said the Professor, "if this be so, Moses says nothing about the first introduction of life, and leaves unnoticed and unspoken of the millions of years that preceded the few thousands since the tertiary."

* Dana, *Manual of Geology*, p. 563.

Of all this he says nothing whatever. Why should he? No one at that time knew any thing of the millions of years and the long series of "populations" before man, and there was no reason why God should reveal it in a book given, not to teach science, but religion. It makes known God's creatorship of all the vegetable and animal world of which any one then had any knowledge. This it does, not in haphazard order, but in that which geology says is correct.

"But," said the Professor, "you will find it very difficult to persuade Christendom that it is right to limit the account to plants and creatures of the present day. The world has always believed that this story tells of the first appearance of life on the globe." Objection 33.

I am well aware how difficult it is to get out of old ruts. But what right has any one to say that "grass, herbs, and fruit-trees"—land-plants—really mean the sea-weeds which for so long were the only vegetation? How could the animals named by Moses refer to times when there was not one whale or fowl or vertebrate of any kind? Taken exactly as it says, it is true and its order correct. Forcing the text involves it in error. I protest against such liberties, and then, because when so twisted it is not true, charging it with contradicting science. Professor Huxley is very severe upon those who force the Hebrew to

say what they think it ought, and yet he does the very same thing, for he assumes that Moses teaches that his plants and animals are all that ever lived, and on this assumption he bases his whole attack on this chapter.*

The Professor replied that this had been to him a real difficulty, for he, too, had always supposed that Moses did tell the story of all life. But, granting this to be a mistake, there was another matter in which, it seemed to him, Moses was in the wrong. Darwin and others who have studied the world's history in its fossils say that present species sprang from others less highly organized, changing from earlier forms to present by imperceptible degrees, requiring, as Darwin says, perhaps ten thousand generations for a single well-defined species; while in Genesis each kind is represented as made abruptly from water and earth, and not from previously existing living forms.

Objection 34.

I see nothing, I replied, as to the how. I read that the plants sprouted forth from the ground; that the waters swarmed with certain kinds of life; and that the earth brought forth cattle, beasts, etc.; but nothing whatever as to the way in which it was done. Therefore there can be no contradiction. The account merely says that God commanded these things to be, tells us the command was obeyed, and leaves us to

*See his "Genesis and its Interpreters," in the *Nineteenth Century*.

discover, if we can, how it was done. To me it looks most reasonable, and most in accordance with Christ's methods (by whom all things were made) when performing miracles, to use what was nearest ready for his purpose; and hence that present animals and plants sprang from the nearest preceding species rather than from raw water and earth.* So far as this I am an evolutionist; but it is evolution under divine guidance, and no less God's act than any other mode of bringing living forms into existence.

As to the abruptness of these occurrences, if by that you mean that Moses represents the plants and animals as coming into being in some way more rapid than that in which Darwin and his followers suppose "development" to have gone on, I quite agree with you.† According to these gentlemen, the change from the old to the new species was an almost infinitely long process, requiring thousands of generations for its completion. Compared with this the Mosaic

* For a fuller statement, see "Miracle, Law, and Evolution," by the writer, in vol. vii, article 7, of the *Transactions of the New York Academy of Science.*

† See *Origin of Species*, page 91. To form a fairly well marked variety would require a thousand or more generations. Darwin is generous of time. On page 90 he says: "But each of these changes may represent a million of generations." Here the mathematicians step in and (*Recent Advances in Science*, p. 175, London, 1876) show that the possibility of life upon the earth cannot extend back into limitless eternity. Some fifteen millions of years, a mere bagatelle to what Darwinism demands, would take us back to an earth whose surface was molten.

"development" appears sudden, or, if you please, "abrupt."

But abruptness is no longer out of harmony with science. Its tendency is strongly that way. Professor Huxley, in his *Lay Sermons*, says: "Darwin unnecessarily hampered himself with the motto that appears so often in his pages, 'Nature makes no leaps.'"

Professor J. Le Conte, in his *Elements of Geology*, page 372, says: "But it is impossible to overlook the suddenness of a new class—*fishes*—and a new department—vertebrates—of the animal kingdom. Observe that at the horizon of their appearance in the uppermost silurian there is no apparent break in the strata, and therefore no evidence of a lost record,* and yet the advance is immense. It is impossible to account for this unless we admit paroxysms of more rapid movement of evolution, and that when conditions are favorable and the time is ripe for a particular change it takes place with exceptional rapidity and in a few generations." "Paroxysms of more rapid movement of evolution" is a scientific euphemism for what in Genesis are represented as results of the divine fiat: Let there be; or, Let the waters bring forth; or, Let the earth bring forth.

The following, from Nicholson's *Ancient Life His-*

* A lost record is the *deus ex machina* that helps your thorough evolutionist out of every trouble. It is so easy to say and so hard to disprove!

tory of the Earth, page 373, is in full agreement with Le Conte: "Upon no theory of evolution can we find a satisfactory explanation for the constant introduction throughout geological time of new forms of life which do not appear to have been preceded by pre-existent allied types. The graptolites and trilobites have no known predecessors. The insects appear suddenly in the Devonian, and the arachnida (the spider family) and the myriopods in the Carboniferous under well differentiated and highly specialized types. The dibranchiate cephalopods appear with equal apparent suddenness in the older Mesozoic, and no known type of the Paleozoic period can be pointed out as a possible ancestor. The wonderful dicotyledonous flora of the Cretaceous similarly surprises us without any prophetic annunciation from the older Jurassic." The fact that Professor Nicholson is not a believer in any special fiat gives all the more weight to his statements, since they cannot be suspected of a theological bias. Professor Dana adds to this the great weight of his name. In his *Manual of Geology*, page 600, he says: "The transitions between species, genera, tribes, etc., in geological history are, with rare exceptions, abrupt." The more these facts are studied the more evident it becomes that at certain epochs wholly new types, that is, with predecessors not at all similar, started into existence without assignable cause; whereas, at other epochs, although the types may be

referable to older forms, yet new genera and species came with equal suddenness into being, and with equal lack of assignable cause. So, too, Moses tells of new plants and animals appearing with suddenness; but he assigns a cause which is amply sufficient for the effect.

Darwin, in his *Origin of Species*, page 424, sets forth his belief that the Creator at some remote period formed "four or five progenitors of animals, and an equal or less number of plants;" or, as he elsewhere expresses it, "Life with its several powers was originally breathed by the Creator into a few forms." To this Messrs. Le Conte, Nicholson, and Dana add, that instead of the uniformly imperceptible changes which Darwin claims in his theory the changes were abrupt and brief, and, so far as science knows, unaccountable, save by some deeper law which as yet no one has been able to discover—perhaps I should say, no scientist has been able to discover.

If the plants and animals of which Moses speaks were produced as he says they were, I cannot see in what respect the geological record would be different from what it is.

Objection 35.

"This is very curious. But as a scientific man I am exceedingly unwilling to admit any divine interposition. I would refer every thing to the working of law; in some cases too deep for us to discover, but yet law."

This would lead to a discussion as to what is meant by law—a question outside of our limits. All we promised to do was to inquire whether the statements in that first chapter of Genesis agree with those records which science has read for us in the rocks.

Still, I will say a few words as indicating what seems to me the truth in the matter. It is a suggestion, and not an argument.

To make my meaning clearer I will borrow an illustration from the laws of our country. These are of two kinds; those which, for lack of a better name, may be called ordinary laws, because they apply to circumstances which are constantly recurring, since they arise from the ordinary conditions of society; and those which may be called special laws, because they refer to matters which, in the nature of the case, cannot occur again. Laws, for example, which prescribe the proper mode of executing and attesting wills or enforcing contracts, or which forbid theft and murder, are of the first class, while the resolution which declared the American colonies free and independent States, and the law which bestowed money and a tract of land on La Fayette, belong to the second class. Those who believe physical law to be only the manifestations of omnipotent will refer to the latter not merely acts of constant repetition, such as those which result from gravitation or chemical affinity, but such as are in the nature of the case infrequent

or even solitary. The former may be called ordinary law, the latter come under special law. The calling of the universe into existence was a special law, since the act admitted of no repetition. In this sense the appearing of plants and animals on our globe was but the manifestation of law. So, too, the "development" of new classes and orders, or even of new genera, must, in the nature of the case, have occurred but a few times in proportion to the births by ordinary generation. Hence it, too, comes under the head of special law—that is, the divine will acting in this special manner at the proper epochs. It makes no difference whether we attribute it to God's direct act, to God's purpose, to God's fiat, or to "special law." In this sense I admit that the production of the plants and animals of which Moses speaks was due to law.

To this the Professor made no reply, but said:

Objection 36.

"How about the age of man? Many think that the six thousand years usually allotted to the duration of the human race is far too small. What is your opinion?"

I do not find any thing about it in this narrative, nor can it, so far as I am able to see, be satisfactorily made out from the histories recorded in the Bible. I am sure, however, that the appearance of man on the earth was very recent.

"But is it not thought that man lived during the latter part of the glacial epoch?"

Yes, I replied, and probably it is true; but you must remember that the glacial period is something very indefinite. In fact, it reaches to the present day, or at least there have all along been glaciers, and there are yet; and under their *débris* the remains of animals and plants of present species have been deposited. Should Switzerland a thousand years hence be searched by geologists they would find under the drift now forming utensils and other things belonging to the present day, and if they were cut off from any knowledge of the intervening centuries the scientists of that day, if affected with a penchant for great chronological stretches, might fling the present epoch back into the times of the great glaciers. In short, of all modes of computing time, this seems to me the most liable to lead to error. Very little is known of the period which reaches from the beginning of the glacial stage to the dawn of history, and conclusions as to the events which occurred, and especially as to their distance from us, must be received with the utmost caution.

But should there, hereafter, be discovered irrefragable proof of man's existence even in the tertiary, it would prove nothing as to this account, since it is possible that there may have been earlier and now extinct races. This the first chapter of Genesis neither affirms nor denies. Elsewhere in the Bible there are statements which look as if there were other

men besides the children of Adam. Here I leave the subject, remarking only that thus far the geological evidence of a pre-adamic man is weak.

"There are," said the Professor, "many other objections which have been urged against this narrative, but I must admit I know of none which is entitled to very serious consideration. Dr. Draper, for example, says that according to certain theologians of a former age the Bible teaches that the earth is flat and immovable, and that there are no antipodes. It is very clear that no such teaching is found in this chapter. Close adherence to the text avoids all such objections. But, on the other hand, would it not lead to other difficulties? For example, it is true that before the glacial epoch trees 'bearing fruit whose seed is inside of it,' became, as they are still, the dominant vegetation, and were pronounced 'good'—that is, completed. But certainly you will not say that all living species were 'brought forth' before that time. Have not many species appeared since? If so, does not that contradict this account?"

Objection 37.

I am not, by any means, assured that a single new species has appeared since the glaciers; but if new species have appeared every genus dates from beyond that time of ice.

But if new species really did appear after the fifth period I see in that no contradiction of this

account. All it says is that the earth in the third period brought forth herbs yielding seed, and fruit-trees, and this all admit to be true. But nothing is said as to its then bringing forth every kind. The difficulty, if any there be, comes, as do so many others, from attributing to this account more than the writer saw fit to say.

"Yes; but the vegetation was pronounced 'good.' This would seem to forbid the idea of further development."

Was not that flora the culmination and crowning glory of the vegetable kingdom? Have any higher or more useful types appeared since the end of the tertiary? And, if not, I see no contradiction, though some varieties, or even some species, were added afterward. Indeed, if I may refer to the second chapter, we have positive proof of a subsequent production of trees pleasant to the sight and good for food. Whether any of them were new species or not we are not told.

"This is not the Genesis which I have read about. It is not the Genesis of commentators. It is not the Genesis in which all the world has believed these many centuries." Objection 38.

Perhaps not, I said; but to us the question is, Is this the Genesis of our Bibles? That it differs from what the world has believed is to you, who have thrown off the yoke of authority, a matter of little importance.

The present reading of the sky and of the earth's crust differs widely from that adopted by "scientists" for these many centuries, and held by them, too, with such earnestness that they wrenched this chapter from its proper meaning to compel it to support their philosophy. Armed with the civil authority, they imprisoned and burned those who dared to say what all the world now knows to be the truth. Galileo, Bruno, and others were martyrs, not to this story of creation, but to the opinionated pseudo-scientists of those days. And now there are those who ought to know better, that write the history of the struggle between the new ideas and the old, and style it a history of the conflict between *religion* (*?*) and science, in which they charge all the cruelty and falsehood upon the book which for nearly four thousand years has persisted in telling the truth about our earth, waiting through the centuries, like the stars and the rocks, in infinite patience, for a science that could comprehend it.

The world would have been greatly the gainer had writers on both sides approached this narrative in a more docile spirit. Attempts to explain it should have been made with child-like willingness to be taught, and with readiness to confess ignorance and to wait for greater knowledge. I may add, too, that a belief in the Bible for reasons independent of this chapter ought to have made its friends less timorous

in reference to the assaults of "science;" and less ready to devise crude theories, often the laughing-stock of men better informed, which should remove the special difficulty in hand, but which too often led to others that were worse.

"What! would you have mankind passively accept this account without examination or criticism, as a child accepts the tales of the nursery?"

Certainly not. I would have them bring to it all their knowledge, examine it most carefully, and apply to it their best powers of criticism; but they should be just to it, and try it, not by what others may have said it says, not by what they think it ought to say, but by its own words.

"I see," said the Professor, "no objection to this; but I am perplexed that so many writers—mostly of very recent date—have said that this chapter was only a hymn of creation, a series of poetical images, having no counterpart in the world's actual history."

I do not think it necessary to show how such ideas have arisen. It is enough for me now that this account agrees so wonderfully with the facts of our world's early history, and especially that its many statements happen (?) to be arranged exactly right.

But another question of far-reaching importance arises, Whence did Moses get the knowledge needed for making such a cosmogony?

To this the Professor made no reply, and for some

moments he sat silent. He had often spoken of the great ignorance of those early ages, and one of his favorite themes had been the progress of man from a brute to a savage, and from a savage, through many intermediate grades, to his present position. At last he said:

"What do you think of this account? Do you suppose Moses knew all about the matters of which he wrote!"

I have repeatedly said that I very much doubt his understanding fully what he wrote, and I may add that I am far from believing that the wisest of us have yet drawn from it all its stores of meaning. These statements of his are descriptions of events or phenomena in language brief but exact, and the value of such is not easily estimated. A child can draw from them instruction; the wisest man cannot exhaust them. The value of exact descriptions can be seen in every department of science. The photographs taken of the last transit of Venus are purely phenomenal. Any child who sees them can readily grasp the fact that the little round black spot on the photograph of the sun's disk marks the position of the planet. This spot he can see as readily as the astronomer; but here the equality ends. The full meaning of the pictures can be dug out only after months of study by men who have devoted their lives to such work. Nor can even they make much progress unless furnished with

every aid of modern science, the most refined analysis, and the most careful microscopic measurements. And when they have exhausted their ingenuity and ceased from their work, the negatives—the prints are not accurate enough for such purposes—will be preserved with the utmost care, because every physicist has lurking in his bosom the conviction that some suggestion, or some discovery, may throw unexpected light upon them and reveal unthought-of truths.

This account is a series of such pictures, not, of course, on glass, but in words, and it is only very lately that science has made sufficient advances to have any adequate idea of its importance.

"Do you mean to say that God intended the Bible to teach science? I thought that had been ruled out long ago."

No, I said; nor did he make the stars to teach astronomy; nor light to teach optics; but, for all that, in them, potentially at least, are those sciences. I do not believe that science can be learned from the Bible any more than history can be learned from the prophecies; but as in the latter we learn their true meaning from the history which records their fulfillment, so the science which gives us so many facts about creation enables us to know what is the true meaning of those brief descriptions which make up this narrative.

That our greater knowledge has changed our views

in this matter was not only to be expected, but the contrary is inconceivable. It would be impossible for an ignorant person and a philosopher to regard natural phenomena alike, and equally impossible to read, in the same sense, a description of them. Moreover, the divergence in their views will be wider in proportion as the ignorant man is sure he understands it all.

It is interesting to note that similar changes of opinion have occurred from the same cause—increased knowledge—in reference to other ancient books. To Herodotus, once contemptuously styled the father of lies, has now been restored his well-earned title of the father of history.

"I must think these matters over. Opinions so long held—not so much as capable of proof, but as too nearly self-evident to require proof—are not to be given up, and their opposites substituted, without a mental wrench that leaves one sore and half dazed. If what you claim be true—that this so-called myth is the most literal and chronological document conceivable—it is a matter of great importance. It annihilates a whole literature, for what is the value of all the books—their name is legion—to prove miracles impossible if here is a miracle which every man can examine for himself?"

The striking of the clock reminded the Professor of the lateness of the hour; so, stopping somewhat abruptly, he bade me good-night.

I said above, in the heat of conversation, "I do not believe science can be learned from the Bible." Further reflection induces me to question this. The Bible gives us facts in many departments of knowledge, and by the study of these, co-ordinating them with each other and with all that can be gathered from other sources, I have no doubt science may be advanced. All admit this in archæology, ethnography, history, and geography; I think it will be found, when men shall study this book in the proper spirit, that it has unsuspected treasures in other departments of knowledge. For every one must agree with Dr. Draper when he says a revealed cosmogony must give foreshowings of discoveries that should be made long after—say, now, or at some future day.

OUR EIGHTH EVENING.

THE VERDICT "GOOD."

THE Professor opened the discussion:

"You have spoken several times of the verdict 'good' which is so often used in this chapter. Why is it sometimes omitted?"

As I have said, good, applied to things without moral character, means only completeness, or fitness for intended use. Its omission, therefore, indicates incompletion. Were some things fully finished, and others left incomplete, when the story passes on to the next stage? Discoveries in modern physics now enable us to answer. Astronomy, spectroscopy, chemistry, and paleontology has each contributed an important part to the solution of this question.

The first and most important thing recorded is the creation of the heaven and the earth. They are not pronounced good, and modern astronomy has discovered that at first, and long afterward, they were not good; for, originally, the heavens and earth were in a gas-like condition, almost infinitely attenuated and diffused. The nebulous matter needed to be gathered into sun and planets, and wrought, through innumer-

able ages, into manifold forms and combinations, before it was good for man or even for plants and animals.

The mysterious moving of the Spirit of God, infinite in importance, is also not pronounced good, probably because it was not a completion, but rather an act whose effects were to be felt to the close of creation.

Light, however long the time from its imperfect beginnings in the nebulous stage to such as we now enjoy, became perfected before the earth had an opaque body, and thus divided between the light and darkness, causing day and night to begin. Accordingly, the verdict "good" precedes that division.

The light was called day and the darkness night, but day and night are not called "good." Nor were they complete, for the earth's axis, not having then its present obliquity, the present charming variety from unequal days and nights and from changing seasons was yet lacking. Not till the fourth period are the days and seasons and other measures of time pronounced good.

The expanse (the *rakia*) was not pronounced good, for in that early period, before the land appeared, it was foul with poisonous gases. It was not good.

The land and sea are pronounced good because, as to all that affects the present population of plants and animals—extent and arrangement, quality of soil, and of ocean waters—they were finished.

The vegetable world became fitted for its highest uses when grass, herbs, and fruit-trees whose seed is in the fruit appeared.

The arrangement as to the two great lights, whatever it was, was final and adapted to the present animal population, and, therefore, is rightly pronounced "good."

As to water creatures and fowl, and, later yet, cattle, beasts, and other *living* things, they crowned the brute creation; nothing better fitted has been imagined. As, therefore, fitted for the final purpose, they, too, are styled "good."

When man appeared, the creation, as a material creation, was completed. As an instrument to be used for its intended purposes it was handed over to the father of our race. Formless matter had become reduced to form and solidity. Force, from a simple centerward impulse, had developed heat, light, chemical affinity, and electricity; and these had been so tamed down that they were ready for the service of man. The gaseous nebula had become solid earth; the black scoriæ of its first surface had become soil full of potentialities; the foul mixture of gases that once surrounded the earth had stored its poison beneath the rocks in beds of coal; and there remained only the life-giving atmosphere. The monotonous sameness of the preglacial world had been succeeded by the present variety induced by changing seasons;

the universal ocean had given place to the present arrangement of land and water, with continents and seas, mountains and valleys, lakes and rivers; the waters had been purified from their excessive amount of silica and lime; the almost structureless sea-weed, once the only vegetation, had been followed by an ever-increasing breadth of development and complication of structure until plant life culminated in the highest and most useful orders, the angiosperms and palms. Brute forms, starting in the microscopic protozoa, had reached their highest point in living vertebrates.

Light, land, and sea, plants, climate, water animals and land animals, each received a separate verdict of "good;" but as to man, separately, that was not said. So far as the earth and its purpose were concerned all was completed. As a whole it received the divine approval in higher terms than before; parts separately had been "good," but, conjoined into one harmonious whole, those which at first did not receive the meed of "good," being now finished and fitted to their place, and man, its crowning glory, added, "God saw all"—the *tout ensemble*—"that he had made, and, behold, it was very good." God, henceforth, ceased to create and make for our planet. It was finished and ready for its mission. But man was not pronounced "good." On that sixth day, which witnessed the highest reach of all else of God's creation, man merely

began to be. His culmination, and only his, lay, and still lies, in the far future.

The Professor's only reply was, "This is a most curious chapter."

Nothing more was said that evening that I care to repeat. We were interrupted by visitors, and did not take up any new matter.

A friend who read the above in manuscript wrote me in reference to it as follows. The reader will notice that he does not question my exegesis of the phrase, "God saw that it was good," but he is shocked at my saying that man, the sinless man of Eden, was not pronounced good.

"Does not 'every thing' include man? Is it not straining a point to say that man was not pronounced good? In his first estate he was made in the image of God. How could he be better? He might not remain 'good,' but he was good—perfect so far as creation could make him."

My friend does not quite see my meaning. "Good," as used in this chapter, has no reference to moral quality, since that can be predicated of nothing which preceded Adam. It implies only completeness, or culmination, or fitness for the intended use. That this epithet is not applied to man at all, and that the verdict "very good" is applied not to him separately, but in connection with all that God had made, is a matter to be decided, not by our tradi-

tional beliefs, but by the evidence of the narrative itself.

The following from Professor Dana is very appropriate in this connection. It sets forth, from the stand-point of a man most eminent in science, the contrast between man and the rest of creation in reference to further development:

"Man was the first being that was not finished on reaching adult growth, but was provided with powers for infinite expansion, a will for a life of work, and boundless aspirations to lead to endless improvement. He was the first being capable of an intelligent survey of nature and comprehension of her laws; the first capable of augmenting his strength by bending nature to his service, rendering thereby a weak body stronger than all possible animal force; the first capable of deriving happiness from truth and goodness; of apprehending eternal right; of reaching toward a knowledge of self and God; the first, therefore, capable of conscious obedience or disobedience of a moral law, and the first subject to debasement through his appetites and a moral nature.

"There is, then, in man a spiritual element in which the brute has no share. His power of infinite progress, his thoughts and desires that reach onward, even beyond time, his recognition of spiritual existence and of a Divinity above, all evince a nature that partakes of the infinite and divine. . . . Unlike other

species, he, through his spiritual nature, is far more intimately connected with the opening future."

The teachings of the New Testament are, that this life is not a finality, but, on the contrary, only a beginning of eternal progress. In the sense of this chapter there is none good but God. He alone of spiritual existences is complete, has no further heights to attain, knows no possibility of progress. Paradoxical as it may appear, it is in this incompleteness that man differs from all the brute creation, and in this is his highest glory.

In the course of our conversation the Professor jotted down the following compact statement showing the use and the omission of "good" all through the account:

Omitted after creation of heaven and earth.

Omitted after the imparting of force or motion by the Spirit of God.

Used after light was caused to be.

Omitted after the division between light and darkness.

Omitted after making the "firmament."

Used after the dry land and seas were arranged.

Used after grass, herbs, and fruit-trees appeared.

Used after the lights were to be for seasons, etc.

Used after water animals and birds.

Used after land animals.

Omitted after man.

Omitted after the five most important statements, and used after only six. The omissions are mostly in the first, or preliminary, part of the account; the use of "good" is chiefly in the latter, or final, stages of the story. In the light of present knowledge of world-making this was to be expected.

OUR NINTH EVENING.

THE DAYS—THE FOURTH COMMANDMENT—SIX STAGES OF DEVELOPMENT—WHAT THIS CHAPTER IS—MY WAY OF STUDYING IT—WHY IT WAS GIVEN—"A HYMN OF CREATION"—HOW IT WAS GIVEN—A RÉSUMÉ.

AFTER welcoming the Professor we began at once upon our theme.

"What," said the Professor, "about the days? Most persons think they present the most difficult problem in the whole matter." He would like to hear my explanation more fully than I had yet given it. He had read several theories; what did I think of them?

All the theories, I replied, may be reduced to two; "the days were common, consecutive days;" "they were periods of unknown length." Until recently there was no question but that the first was the explicit teaching of the story as well as of the fourth commandment. So long as it was a matter of power only the shortness of the time presented no difficulty. But when it was found that layers of rock many thousand feet thick were filled with myriads of extinct plants and animals following one another in successive "populations" this theory was seen to involve a question of divine veracity. Either these forms, with all

their organs for digesting their food and for reproducing their kind, were counterfeits, made for no purpose but to deceive, or the world had been in existence an enormous time. To break the force of this there was devised a modification of the theory.

Yes, it was said, it is true; God made all things in six consecutive days, common days, and it is also true that the world has existed for perhaps millions of years, and they explained the apparent discrepancy thus: After God had created the heavens and the earth there was between that act and the conditions described in the next sentence a stretch of time of whose duration no hint is given, but which was long enough for all the demands of geology. In this interval lived the plants and animals whose remains are found in the rocks; and here took place the degradation of mountains and the erosion of valleys which now excite our astonishment. At last, for some unrevealed reason, the world was destroyed. All life went out, a pall of thick darkness covered the earth, and the seas overwhelmed the land. After a time, we know not how long, the Spirit of God moved upon the face of the waters, the clouds began to break away, and there was light, good indeed, but mingled with darkness; then God separated between the light and the darkness; called the light day and the darkness night. Then darkness came down again and there was evening. Twelve hours later, the night having passed,

the light began to re-appear and there was morning. On the next day the expanse was formed. Again the day waned, and it was evening. The night came on. A few hours more and there was morning, and that was the second day. With returning light began the third day. It opened on a dead world buried in a shoreless ocean. The divine word went forth, and at once the fifty million square miles of land rose from beneath the waters. How such a mass of water could run off in a few hours without a yet greater miracle the advocates of this theory do not say. But it was done. Then, say at noon, all kinds of plants came up. That such plants might live required a miraculous removal of the salt from what had been that morning an ocean bottom. But it was done, and that very afternoon grasses, herbs, and fruit-trees, to which salt was a deadly poison, abounded. Again the light grew dim and evening came. Night followed and rest, for a few hours, and then came the morning, and this ended the third day. Three times again did the divine command go forth, and all was done.

This theory requires so much destroying and re-creating—not one quarter of the difficulties have been mentioned—such a heaping of miracles upon miracles, that few now accept it.

Dr. Pye Smith offered an amendment. He thinks that Genesis refers merely to a local creation in west-

ern Asia. This, if possible, is still more unsatisfactory.

The theory which regards the "days" as periods finds most favor with those who have enough knowledge of geology to appreciate the difficulties of the six consecutive days. Some, however, find themselves perplexed because the fourth commandment seems to support the belief that the "days" were common days. A careful study of the decalogue will, I think, relieve their minds.

In reading the commandments one is struck with a certain peculiarity running through them all. It consists in the frequent use of that figure of speech called synecdoche—that is, putting a part for the whole. Thus: "Thou shalt not kill" names but one crime, but forbids all offenses against the person. "Thou shalt not commit adultery" names only one act, but forbids all impurity. "Thou shalt not steal" forbids not theft alone, but all dishonesty. And so I might go through the list; every-where a single act is mentioned while a whole series is meant. In the same way six days stand for six stretches of time. The word "days" evidently is figurative in the fourth commandment, and I see no insurmountable objection to regarding it as figurative in the first chapter of Genesis. But such a meaning appears out of harmony with the intense literalism that pervades the account. For this reason, and because I thus follow

more closely the exact statements of the writer, I prefer to regard the days as common days which serve to mark the end of the creative periods.

Perhaps a homely illustration may help make the matter clearer. Suppose I wished to make for my child a brief epitome of our country's history, and, furthermore, that I had no system of chronology, yet wished to impress upon him the order. I might number the days on which certain important events occurred, or which served to mark the end of one stage and the beginning of the next, somewhat as follows:

The Indians, undisturbed and unheard of, held America till Columbus discovered it, on day the first.

Only Spaniards and French sought to make settlement till Jamestown was founded, on day the second.

There was strife between English and French until Quebec was taken, on day the third.

Our people remained subject to England till Declaration of Independence, on day the fourth.

There was a time of weakness and disorder till the present Constitution was adopted, on day the fifth.

There was struggle between liberty and slavery till Lee surrendered, on day the sixth.

Here is a series of days separating important stages in the history of our country. There would be no impropriety in my afterward saying that in some

relation to this hexad of days ("six of days")* God, in his providence, built up this nation. And as these days differed in no respect from others, neither did those of Genesis. The former divide our history into periods of whose length my little epitome gives no intimation, and the latter do the same for the early history of the world.

"You speak," said the Professor, "of six divisions, or stages, in the world's history. I have always understood that such divisions could not be made without clashing with modern science. Can six sections be made that do not run into each other?"

I replied that as to the first three periods enough was known to show that the demarkation between them is sharp and distinct. As to the fourth, the line is sharp, although as to what then occurred scientists are as yet in doubt. Between the fifth and sixth periods the line, although not sharply drawn, is tolerably distinct. I would give the divisions as follows:

1. The first stage—astronomers would call it the Nebulous—begins at the "beginning." It includes the creation of matter, the imparting of motion, the production of light, and the reduction of the temperature of the earth's crust to a point at which it ceased to emit light. It ends at the first day and night on our

* In the Hebrew it is "a six of days," that is, "a hexad of days." The preposition *in* is not in the original.

planet. Here the line is well drawn, for since that first day and night there has been no creation of matter or of force, and no change in the quality of the light.

2. The next stage commenced after day and night had begun—that is, after the end of the first stage. Its work was the condensation and deposition of the vapors due to the yet hot earth, and the consequent clearing of the atmosphere. It ended when the air became so clear that the expanse could be called "heaven," and in it the heavenly bodies be seen.

This stage does not lap either way, for its work could not have gone on before the "first day," because the earth was then too hot, and, once done, it has never needed to be repeated.

Geology styles this the Azoic age, or, as to the latter part of it, the Archæan. It might be called the Pluvial stage.

3. The work of the third stage was the elevation of the land above the seas, the purification of the waters, the preparation of the soil, and the production of grasses, herbs, and fruit-trees.

This stage did not begin (could not begin) till after the previous one was ended; and it was ended, so geologists say, before the close of the tertiary.

In its time-limits it reaches from the earliest archæan to the time just before the glaciers. Since then nothing of importance has been done in either direction. There was no lapping on to the next.

4. The fourth stage witnessed the introduction of the modern type of climate, with seasons and unequal days and nights. No such type existed before the pliocene. Then came the glacial epoch. Since that time no change in reference to seasons and unequal days and nights has occurred.

5. The fifth stage witnessed the production of living species of water creatures (fish and other vertebrates) and fowl. Whatever may have come down from the earlier days, there was addition of now living species after that climatic change. This, which corresponds to the quaternary period, is a well-defined epoch of development of present marine vertebrate animals and of present birds. So far as science knows, none have been added since.

6. The sixth stage is equivalent to the recent period, and comes down to the time of Adam. It witnessed the production of present cattle, beasts, and other land creatures. According to Professor Dana, almost none of these go back into the Champlain period.*

The Professor made no reply to this except to remark that the geological record since the pliocene was so unsatisfactory he had very great doubt whether we could at present draw a line between the last two periods. Science shows the existence of a pretty

* "The mammals of the quaternary are nearly all extinct."—*Manual of Geology*, p. 563.

well-defined demarkation between the land fauna of the quaternary and that of to-day. This is as far, perhaps, as we can at present venture to speak with any positiveness.

The Professor sat a few moments in silence, and then said: "This is a very different document from what I have always supposed. But old beliefs are not easily thrown off, and I can hardly say that I accept it as true. The argument seems conclusive, but I am dazed by the greatness of the results if it be actually true. It is too great to be believed. I do not wish to argue to-night, but only to listen. Tell me just how this story looks to you. What is it? How did you come to view it as you do? I shall wish to ask other questions, but please answer these first."

Whatever I can say is liable to imperfection and error, for my knowledge is very limited. If, upon more thorough examination, defects shall be found in my exposition, you must not, therefore, draw conclusions unfavorable to the truth of this narrative. Too many real correspondences have been pointed out between it and what scientists have claimed as their discoveries to permit it to be lightly regarded. I know, too—no one can be more sensible of it than I—that its depths have not all been sounded, nor all its heights been scaled. Others, with greater knowledge of the Hebrew and with the help of a more advanced

science, will find treasures beyond my reach. Of some, even now, I catch tantalizing glimpses. And then, too, the discussion of the three last periods lacks that full and satisfactory character which can come only when geologists have given us—if that shall ever be possible—a full and connected account of what took place between the end of the pliocene and the beginning of history. At present, amid abundant assertions, our knowledge is very meager, both as to the things done and their causes.

You ask me how I look upon this chapter. To me it appears to be a series of statements, each setting forth an event, or condition, or transaction, in the world's early history. These I find placed one after the other in the true order, but with no intimation of the vast intervals of time by which they are separated. As, when we look at the stars, they all seem equally distant, and we learn better only from the teachings of astronomy, so to the ordinary reader all these transactions seem equally distant until a greater acquaintance with the past teaches him better.

Of some things, as light, matter, and motion, the writer speaks of their beginnings, while as to others he records only their completion. Of plants he speaks only of the latest and most useful kinds; of animals he confines himself to living species. Not a few of his statements are of such a character that on their truth depends the very existence of whole de-

partments of modern science. Nor is their great value nor their order a matter of accident. For the number of these statements compels the belief that they were designed. With a slight verbal change, making diametrically opposite sense, I adopt the words of one to whom I owe so much,* "The Mosaic story is the work of a profound intellect versed in all the depths of science which the future was to reveal," if indeed it be not the perfection of irony to speak of the depths of human knowledge in His presence who seems to me to be the Author of the account.

"How did you arrive at your belief in this narrative? You certainly did not start with it. What course did you pursue?"

No, I replied, I did not start with it, for when I began to study this chapter I had no clearly formed opinions about it, except that if it was from God it would bear comparison with the most advanced science, so far as the two treated of the same subjects; or, as Dr. Draper so admirably puts it in his *Intellectual Development of Europe*—I repeat the quotation: "Considering the asserted origin of this book"—he is speaking of the Koran, but his words apply equally well to any book claiming to be a revelation—"indirectly from God himself—we might justly expect that it would bear to be tried by any standard that

* So much as to the world's history, but nothing as to the explanation of this chapter.

man can apply, and vindicate its truth and excellence in the ordeal of human criticism. . . . As years pass on, and human science becomes more exact and more comprehensive, its conclusions must be found in unison therewith. When occasion arises it should furnish us at least the foreshadowing of the great truths discovered by astronomy and geology, not offering for them the wild fictions of earlier ages, inventions of the infancy of man."

It makes no difference that Dr. Draper thought he was setting so high a standard that it would render the claims of the Bible ridiculous. I thank him that he has done so, and trust that he and his co-believers will say no more about the absurdity of looking, in what claims to be a revelation, for the foreshadowing of great truths discovered by astronomy and geology. According to him, such looking for scientific truths is the proper mode of testing such a claim. These high demands of the learned doctor absolutely require the Bible, if it really be a revelation, to disagree with the conclusions of science through all of what may be called its formative stages; hence, to disagree with the science of the world almost to the present day, and where science is yet formative—and consequently, of necessity, largely erroneous—we must, on Dr. Draper's showing, still look for disagreement. I need hardly say that the history of the past shows a refusal on the part of the

Bible to agree with the current science, and this, to my mind, is no small argument in favor of its superhuman origin.

But, to return to your question. Heartily agreeing with Dr. Draper as to what a revealed cosmogony would do, I concluded to see how far the one which we have been discussing would bear his test. I determined to drop all *a priori* notions as to what a revelation could or could not do. All theories, thus far, had proceeded upon the assumption that there was some great defect, or impassable limit, either in the knowledge of the writer or in his fear of going beyond the capacity of his countrymen. I thought to try another theory, to wit, that, God being the real author, I need have no fears that our science would overstep his, and, therefore, dropping all limits other than he had placed on the record, I determined to take his words in their fullest and freest amplitude of meaning.

I first spread out before me, as on a great chart, the discoveries of astronomers, geologists, and others, pertaining to the early history of our earth. Then I took up the statements in this story of creation, and looked on my chart for something to which they exactly corresponded. I made no account of previous beliefs or theories, asked no questions as to time or order, or whether Moses meant it or not; I just looked for counterparts of his brief descrip-

tions. When I found one I placed by it the words of Moses, and then passed on. I will not trouble you with an account of my easy success in some cases, nor of my long and, for a time, unsuccessful but never wearisome search in others, and my finding diamonds in what seemed valueless pebbles, the glorious flashes of light by which my path was often illumined, nor of failures sometimes to make any progress—failures due, as it turned out, to my ignorance of some physical fact, or else to my following a version which led me away from the Hebrew original.

At last I had each statement placed, and then, looking over the whole, to my delight I found that their order on the chart was exactly that in which Moses had left them. That the story was true was as certain as the truth of the sciences which verified it; that its order was correct was equally beyond question; that it was not an allegory was evident, for there by its side was a physical fact for each sentence.

"I have often wondered," said the Professor, "how you came to be so decided in your belief. But with the experience you have been through I do not see how it could be otherwise. I have read various statements as to what was God's purpose in giving this account to man. I must confess I never felt much interest in the matter, because it seemed to me the writers were trying to devise something which should enable them to escape from some of their many assailants; but

now I feel very differently. Tell me what, so far as you can judge, was the purpose of its author in giving this account to man?"

I think I can see several purposes. One—the chief—to set forth God's creatorship, and to impress upon mankind the Sabbath as a perpetual reminder of that fact; another, to make manifest God's intense personality, as distinguished from blind force; and last, but possibly not least, to authenticate to future ages, when knowledge should have been increased, the high origin of that book of which it is the opening chapter.

I have already pointed out the broadness of the claim to universal creatorship here put forth. It shows itself all through the chapter, but perhaps more noticeably in reference to animal life. The fiat commands certain kinds of creatures to appear. The record says that it was done, and then adds that God created not these alone, but "every living" creature, not merely those that came into existence then, but all living kinds; thus foreshadowing the fact lately discovered that many living creatures at these epochs had come down from earlier times.

The narrative impresses on man the Sabbath as a day of rest by dividing the history into six periods of work and then placing at the close a day of rest. If the Sabbath had thenceforward been observed for the reason assigned in the fourth commandment the worship of false gods would have been impossible.

God's personality shows itself in such phrases as "God said," or "God saw," or "God made." So thoroughly is this thought wrought into the story that it refuses to be read in any other sense. Let any one attempt to substitute for God some other word, for example, force. He will get through but few lines before he will be compelled to feel that it is no abstraction, but a living person, of whom he is reading. I hope you will make the experiment at your leisure and go through the chapter. I will repeat a few verses which suffice for my present purpose.

"In the beginning force created the heaven and the earth. And the earth was without form, and void; and darkness was upon the face of the deep. And the spirit of force moved upon the face of the waters. And force said, Let there be light: and there was light. And force saw the light, that it was good: and force divided between the light and the darkness. And force called the light Day, and the darkness he called Night."

We have gone through but a few lines. Plainly "force" is a person that thinks, wills, approves, and names. We feel that in writing "force" we have been guilty of disrespect, and that at the least it should be Force. This does not satisfy us, and we hasten back to that word which expresses infinite force with perfect personality, God.

I said this story authenticates the Bible. It does

it by the exhibition of so much knowledge which, until the present time, was unattainable by man. It reaches from the "beginning" to Adam. Of necessity it passes in silence over vast stretches of time in which occurred many events of great importance, or what is now a chapter would have been swelled to a vast number of volumes, and thus the utility of the book as the companion and comforter of man would have been destroyed. It seems incredible, but it is a fact, that these omissions have been urged as a strong if not conclusive reason for rejecting the claim of this chapter to be inspired. The folly of such reasoning is surpassed only by its presumption.

To this the Professor made no reply, but remarked: "The world has always supposed Moses referred to events which occurred six thousand years ago. I admit that he does not say so, nor does he say any thing to the contrary. He is merely silent. Now, what right have you to say that he refers to matters a thousand-fold more distant? Then, too, the story moves on apparently without break from day to day from the first to the last; what right have you to separate statements so joined, and to place between them intervals of thousands, if not millions, of years? I do not ask to argue, but I really wish to know?"

The world's opinion has always been a very unsafe

guide in any matters pertaining to our earth or its history, whether in the Bible or out of it.

Moses leaves the time of the beginning of creation an open question. He merely states certain things, with no intimation as to how much or how little time separates them. This is a fact of great importance, but one exceedingly difficult to realize, because it requires us to rid ourselves of beliefs which have been held from childhood. His narrative, when collated with astronomy and geology, agrees, each statement with a fact throughout, and what, if possible, is more marvelous, the order is the same. These agreements are many in number and of the most profound importance. Such and so many agreements could not be mere chance coincidences. Hence I conclude that this narrative was intended to describe the very transactions to which it so exactly applies. The laws of my mental being allow me no other conclusion. *Ergo*, it was *intended* to extend over all the time which the transactions occupied. Astronomy and geology assure us that these were separated by intervals of unequal length aggregating untold millions of years. The account itself says nothing for or against there being such intervals. Agreeing, as it does, in all else with the broadest science, we would stultify ourselves to say that silence is contradiction. The case is very similar to that of the little skeleton outline of American history which

I employed in illustration of the "days." The child who read it without other instruction might, perhaps, believe it the story of a week; but when, in after years, he learned from other sources that it in reality spread over several centuries, he would need to be an uncommonly stupid child to insist that its author taught that the events which it mentions followed each other with no greater interval than a night.

"But," said the Professor, "is not this often styled a Hymn of Creation?"

Yes; and I see no great objection to it. A hymn may be true as much as if it were prose. We may imagine that at some remote time—perhaps before the flood—there lived one who believed with all his heart in one God, Creator of all things. We can think of him as meditating on the heavens, and the earth with its teeming population, till his thoughts took form in words. His theme would be God, Creator of heaven and earth, and in loving detail we can imagine him going through the catalogue of God's works in some such outline as this, but amplified in working out the poem:

In the beginning God created heaven and earth.
God made the light, and separated it from the darkness, and called the one Day and the other Night.
God made the expanse over all.
God made the dry land appear, and the waters to fill the seas.
God made the grass, the herbs, and the fruit-bearing trees.
God caused the lights in the expanse of heaven to be for signs, and for seasons, and for days, and for years.
God made them also, and caused them to shine for man; he made the stars likewise.

God made great whales and other creatures of the sea.
And fowl to fly in the expanse of heaven.
God made the cattle, beasts, and other living beings that move upon the land.
God made man. In the image of God made he him.

At first it would not appear impossible that some uninspired man might have written such a poem. It would excite our surprise that while all other cosmogonies abound in monstrous polytheistic fables this is wholly free. Had we lived before the present century, we might have wondered that the writer, if inspired by the All-Wise, should have been so ignorant of true science as to represent the earth as once *tohu va bohu*, "infinitely attenuated, nothingness, and void;" and that he should say light existed before the sun, and was called good, before it was divided from the darkness. We might have insisted, as did the philosophers of early days, that whatever *rakia* might mean in itself it must here have been intended to describe a solid support for the waters above the earth; for surely the writer, if inspired, must have known about the crystalline spheres which every tyro in "science" knew supported the vast upper stores of water. And, as of all things perhaps the most important was the firmament which kept the waters from descending and drowning out all life, we would have thought, as did the scientists among the translators of the Septuagint, that it was by an oversight that the firmament was not called good. Of course

it was good, and the author of the account must have intended to so call it, and therefore we should have approved of their interpolating the words, "And God saw that it was good."

Then, in regard to the fourth period, we should have had several faults to find, but chiefly that the poet ignored weeks and months; and when we came to the next period it would seem strange and very unscientific that birds should have appeared simultaneously with water creatures rather than with land animals. In fact, orthodox scientists had a hard time of it till they began to know something of the world's real history. It was not the order that troubled them, for, so far as they could see, one order was as good as another. Naturally grass came before cattle, but why it came before whales they could not see, and did not imagine it was a matter of any consequence.

Calling light good while it was, as they thought, mingled with darkness was a little singular, but it did not make any difference. Perhaps the reason the firmament was not pronounced good was that the devils were made on that day.*

To-day we have a very different science, and no longer is it necessary to do violence to the dictionary to eke out a harmony between it and the story in Genesis. The physical statements in the latter readily find their counterpart in the world's history. And if

* See commentary in Luther's Bible on this omission.

these are chance agreements there remains the greater miracle, the correct order. There are here a large number of important points in which this story touches modern science, yet every-where the order is the true one. It is this above all else that proves this story is from some higher source than an unaided man.

"How," said the Professor, "do you think this story was made known to Moses, or whoever wrote it? Was it put bodily into his mind, or did he see the transactions as in a vision?"

Since nothing has been revealed as to the mode of Moses's obtaining this account, all that I can say is entitled to little weight. Very much which he has recorded could in the nature of the case have been made known to him only by actual words, either spoken or in some manner put into his mind. For example, the first two verses—no vision could depict what they record. Even now, with the aid of our greatly increased knowledge, we can conjure up nothing better to represent God the Creator, or God the Spirit, the darkness, and the moving upon the waters, than certain conventional symbols which would have had no meaning to Moses and his contemporaries.

Then there is all that God is represented as saying. This, too, could be conveyed to Moses only through the medium of words, and it forms a large part of the narrative.

Besides all this, I continued, there is internal ev-

idence that the author of this account had the skill and knowledge of a trained observer—a kind of person unknown in those days and not very common now. Every one who has had experience in obtaining descriptions of natural phenomena from ordinary persons knows how exceedingly difficult it is to get them to exclude useless and extraneous matters. Knowing little of the relative value of the facts which they have witnessed, they are likely to record those of no consequence and to omit others of the highest value. But here, in this series of phenomenal descriptions, every word is appropriate, every fact of transcendent importance. There is, too, an evident freedom and vivacity, a lack of doubt or hesitation, as if error was impossible, which can be justified only by the truth of every statement. I cannot conceive of any man viewing the past and selecting such facts and describing them in language so exact. The only conclusion that appears to meet all the conditions of the problem is that this narrative was received from a supernatural source. There may, or there may not, have been an audible sound. Perhaps words were unconsciously put into the mind of Moses. But in some way he knew just what words to use.

I then spoke of Professor Huxley's remark, "The student of nature will trouble himself no longer with these theologies," and asked what he thought of it, in view of what we had seen as we went over the account.

He replied: "Unless Professor Huxley shall explain away the facts—and I do not see how he can—he is bound as a fair-minded man to recall his words. I have no doubt that, with his usual acuteness and that freedom from all theological bias which he claims for himself, he will examine the matter thoroughly, and either make the *amende honorable* as frankly as he has made his charges, or else he will point out just what it is in this story that is contradicted by science.* If he will not do this I shall think that his opposition to this part of the Bible arises, not from a love of the truth, but from some other motive. In such a case I shall look to that eminent scientist, Dr. Draper. He certainly should be able to point out the contradictions of science, if there are any, because he has made a study of what he calls the conflict of religion and science. Until that is done I shall venture to believe that no such conflict exists.†

"Either of these gentlemen could greatly aid in settling this question if he would write out his own version of our world's history in language as brief and simple as that of Moses, omitting every thing about

*In the *Nineteenth Century* Professor Huxley shows that what he calls the central idea of this account is an error; but as that "idea" is not taught in Genesis, it is still in order to ask the Professor to point out something in this story which is contradicted by science.

† Since the above was written Dr. Draper has died. I let the passage stand, hoping that he on whom his mantle shall fall will in this matter take his place.

which scientists are still disputing. An account made up of admitted facts, placed in their true order by such men, would be most welcome. But I fear it will never be written."

With this we ended our discussion, in a very different spirit on his part from that in which it had begun.

A few days later my friend removed to a distant part of the country. I have met him several times since, and we have discussed a number of questions about the Bible; but, whatever doubts he may express as to other matters, he no longer denies that at least one chapter is true, and is inexplicable on any theory that assumes its human origin. At his request I prepared and sent him the following epitome of the teachings of Genesis:

The universe is not eternal, for God created it.

The earth was once formless—that is, part of a nebulous mass, and had neither land nor seas, plants nor animals—"void." At first it was non-solid, mobile, easily flowing, *mahyim*. And darkness covered it.

After motion was imparted by the Spirit of God there was light. The light became good light before there were days and nights.

After days and nights had begun there was an expanse, or thinning, made in the midst of the dense atmosphere of steam and clouds which at first enveloped the earth. The expanse was not yet fitted for higher forms of life—not "good."

After the waters were deposited under the expanse, the earth was covered with water, beneath which lay the future continents. The seas and oceans are one great basin—"one place."

Of the vast geological periods from the beginning of the emergence of the land till both land and sea could be pronounced ready, or "good" for their intended purpose, all is passed over without notice.

In the rest of the account the writer speaks of things the Hebrews knew of and were interested in, the contemporary plants and animals, and the sun and moon and stars, the various measures of time, and of Adam, their great progenitor. Moses says God made all these, and to the Hebrews that was the only matter of moment about it. But from a scientific standpoint the most interesting thing is the order in which Moses says God made them.

Genesis puts the modern flora first, not of all organisms, but of the three "horizons" of which he speaks.

Next come the arrangements by which the great lights were to divide between the day and the night, and were to be for times and for seasons, and for days and years.

Still later come great whales and other living kinds of water animals and fowl.

Then come cattle, beasts, and other living land creatures, and lastly Adam.

I added a list of "errors" often charged to this

story unjustly, being for the most part somebody's inferences or false science interpolated, perhaps unconsciously, into the account: "The universe was made six thousand years ago." "Light and darkness are substances." "There is a solid dome or arch above the earth." "The sun and moon are supported by that arch." "The earth is the largest body in the universe." "The continents and seas were made in a few hours." "These were all completed before any plants or animals existed." "There were no plants or animals before grasses, herbs, and fruit-trees." "The sun was created after these plants." "The earth is larger than the sun or the stars." "There was no animal life on land, or in the water, before whales and birds." "There were no land animals before cattle, beasts, and other living creatures." "There were no men before Adam."

Not one of these statements is found in this account. Each is merely an inference by somebody from what he thinks Moses meant. Mostly they are bare interpolations. As to the last, it is more than doubtful whether men existed before Adam, but, in any case, nothing is said about it. The other statements have been refuted again and again, and yet each time the opponents of revelation had congratulated themselves that it had received a fatal blow. The last success in this direction is Professor Huxley's in the *Nineteenth Century*, where he tells Mr. Gladstone that there

were water creatures before whales, flying creatures before birds, and, he might have added, vegetation before grasses, herbs, and fruit-trees.

But as Genesis says nothing to the contrary it is difficult to see what bearing the Professor's article has on this chapter.

DR. DRAPER'S TEST.

WHAT OF MODERN DISCOVERIES ARE FORESHADOWED IN THE HEBREW STORY OF CREATION.

1. It states distinctly that the universe had a beginning, thus anticipating the result of Professor Tait's law of "Degradation of Energy."

2. That the heaven and earth were not created all finished. It states distinctly three most important characteristics of the earth's primordial condition. The earth was, it says, *tohu* * *va bohu*, rendered in our version, "without form and void;" it was a non-solid or fluid substance; it was a profound abyss. These foreshadow the nebular hypothesis.

3. It says that light was not eternal, nor self-existent, and that darkness preceded motion. It thus foreshadows the modern discovery that light is a mode of motion, and that late generalization, the correlation of forces.

4. It states explicitly that matter and motion are each due to the will of the First Cause. It thus foreshadows the results of the highest modern philosophy.

* No word in our language can do justice to the exquisite exactness of *tohu* as applied to the infinitely attenuated matter out of which the earth was formed. See page 43, this book.

5. It foreshadows what modern physicists look upon as their discovery. That light is older than the sun.

6. It foreshadows the fact discovered by the spectroscope, that nebulous light became the same as solar light (that is, good) before day and night began their alternations.

7. It intimates very plainly that after the earth had so cooled as to have days and nights, it was wrapped in dense aqueous vapor.

8. It more than foreshadows the recent discovery by paleo-chemists, that at first the atmosphere was poisonous with foul gases—was not good.

9. It teaches what is a very recent discovery, that originally the water covered what is now dry land.

10. It more than foreshadows the great geographical discovery of the fifteenth and sixteenth centuries, that the oceans and seas form one great basin.

11. It more than foreshadows the true order of development of the organic forms which are contemporaneous with man.

12. It foreshadows an important and recent geological discovery when it places the present flora after the completion of the oceans and continents,

13. And before the present vertebrate fauna of the ocean,

14. And before the fowls of the air.

15. It foreshadows something yet to be made known—probably, as it seems to me, the introduction

of seasons and unequal days and nights. Three geological facts in harmony with this are known:

(1) The earlier and by far the larger part of the world's history shows no evidence of seasons.

(2) An immense and all-important climatic change after the production of present genera of plants.

(3) The glacial epoch having passed, there is thenceforth abundant evidence of seasons with all that that implies.

16. It foreshadows the geological fact that the higher kinds of water creatures and fowl—those now living—are of one "horizon," * and that they preceded the "horizon" of cattle, beasts, and other creatures of to-day.

17. It foreshadows the failure, at least thus far, of scientists to discover any classes, orders, families, or genera of plants or vertebrate animals whose origin is more recent than the six thousand or ten thousand years, or whatever it may be, since present cattle and beasts appeared. The birds and beasts carved or painted on the Egyptian monuments are fac-similes of the birds and beasts there to-day.

If any document by any scientist, ancient or modern, can be found "foreshadowing" equal to this, I would like to see it.

* "Of the same horizon is said of fossils which appear to have lived at the same time."

THE TRADITIONAL STORY OF CREATION.

SUPPOSED TO BE FOUND IN GENESIS, CHAPTER I.

In the following paraphrase I have endeavored to set forth, briefly and clearly, what is usually regarded as the explicit teachings of the first chapter of Genesis, and accepted as such by friends and foes. Recently, however, its friends have abandoned the six thousand year date of creation, and most of them have adopted the belief that the days here spoken of were great periods, and that "firmament" is a mistranslation. One change in the order I have adopted, because "the science" of the best-informed of say fifty years ago approved of it, not formally, indeed, but logically. I refer to the light's being good *after* it was divided from the darkness. It will be seen that I have condensed and omitted in order to save space and avoid repetitions; but in no case have I done so where it would affect, *pro* or *con*, the account.

The traditional Genesis has been the object of the attacks based upon the "mistakes" of Moses, and it is here that the opponents of revelation have won their victories. In direct violation of the "scientific method," they assume that these second-hand statements are the teachings of this account, and when

they have demolished what somebody says Moses intended to say, they shout in triumph that the student of nature will no longer trouble himself with these theologies.

In the beginning, about 6,000[1] years ago, God created the heavens and the earth, out of nothing.[2]

And the earth was a chaotic mass, without law or order.[3]

And God made the substance[3] darkness, and it covered the deep.

And the Spirit of God moved upon the face of the shoreless water.[4]

And God made the light-substance,[5]

And the light and the darkness were mixed one with the other,[6] until God divided the light from the darkness.

And after this division God saw the light, that it was good.[7]

And God called the light Day, and the darkness he called Night.

And all this was done in one day—the first day.[8]

And God made a solid, transparent dome over the earth, to support the upper waters and to separate them from the waters beneath.[9]

And this, too, was good.[10]

And the firmament was made in one day—the second day.[11]

And God said, Let the waters be gathered unto one place and let the dry land appear.

And, at once, it was done.[12]

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[1] Genesis says nothing of 6,000 years.

[2] Not so stated in Genesis.

[3] Genesis does not say darkness was a substance.

[4] Genesis says, "on the face of" *mahyim*, something not solid, the exact equivalent of our word "fluid." It does not say "shoreless."

[5] Genesis nowhere says or implies that light is a substance.

[6] Genesis does not say that the light and darkness were mixed. They were, indeed, divided, as they are now, by the opaque earth.

[7] Genesis puts "good" before the division. So does science.

[8] Genesis merely announces after the work a day—the first—but does not say any thing was done in it.

[9] Genesis says nothing of any solid support. It speaks only of an "expanse."

[10] Not so pronounced in Genesis. [11] See note 8.

[12] Genesis does not say it was done in a moment, nor in what time.

The sea and the land, in a few hours, were completed in all their present extent.[1]

And God saw that it was good.

But as yet God had made no plants nor animals of any kind.[2]

And God said, Let the earth send forth its first vegetation,[3] namely, grasses, herbs, and fruit-trees bearing fruit whose seed is in it. And it was so.

And first of all plants[4] appeared grasses, herbs, and fruit-trees, and clothed the hitherto naked earth.

And God saw that it was good.

And all this was done on one day[5]—the third day.

But as yet the sun, moon, and stars were not in existence,[6] and there were no water[7] creatures, nor fowl,[8] nor land animals.[9]

And God said, Let there now be made great lights in the firmament of heaven,[10] and let them divide the day from the night, and let them be for signs, and for seasons, and for days, and for months[11] and years.

And God made the sun and moon and the stars all at this time.[12]

And all this was done on one day[13]—the fourth.

And as yet God had not made any living creatures—either in the water, or in the air, or on the land.[14]

But now animals—the first kinds on our globe—appeared, to wit, great whales and other water creatures and fowl,[15] but as yet no land animals.[16]

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[1] Genesis does not say so.

[2] Genesis does not say so.

[3] Genesis does not say this was the first vegetation.

[4] Genesis does not say so.

[5] Genesis does not say so.

[6] Genesis does not say so.

[7] Genesis does not say so.

[8] Genesis does not say so.

[9] Genesis does not say so.

[10] Genesis does not say so.

[11] Genesis does not speak of months.

[12] Genesis does not say so.

[13] See note 8.

[14] Genesis says nothing as to whether God had previously made any animal.

[15] Genesis says nothing as to these being the first animals on the earth.

[16] Genesis does not say so.

And all these were created in one day—the fifth.[1]

And God said, Let now the first land animals appear, and let land life now begin in cattle, beasts, and creeping things.[2]

Thus far in the story almost every thing has been falsified by traditional belicfs. The rest of the account has not been affected in this way.

[1] See note 8.

[2] Genesis says nothing of these being the first.

THE BABYLONIAN LEGEND OF CREATION.*

IS IT THE ORIGINAL OF THE STORY IN THE FIRST CHAPTER OF GENESIS?

Among the interesting "finds" on the banks of the Tigris are tablets which are said to contain the original of the Hebrew account of the creation, the fall, and the deluge. As to the last, there can be no doubt that the tablets give a distorted version of that great cataclysm. This is not surprising. The comparative nearness of the event accounts for the accuracy of some of the details. As to the fall, Professor Sayce, in his revised edition of Mr. George Smith's *Chaldean Genesis*, says: "No Chaldean legend of the fall has been found." Whether Professor Sayce is right Assyriologists must decide. The sole question I propose to consider is this: Whatever may or may not be true as to other matters, did the Hebrews derive their cosmogony from Chaldeans? Is the story on the tablets the original from which the Bible story of creation was taken?

It will, I think, conduce to clearness of thought if we state what is necessary to constitute one document

* As given in the versions of Mr. George Smith and Professors Sayce and Lenormant.

the original of another. 1. It must be older. 2. It must treat of the same subject. 3. There must be great similarity, amounting almost to identity, in thought, language, order of statement, and mode of treatment. The first and second are of no importance without the third.

It is said that the great antiquity of the Chaldean account establishes its priority over that in our Bible, and that the long sojourn of the Hebrews in Babylon gave them an opportunity to obtain it from the records in that city. It happens, however, that whatever may be the age of the other myths, the Babylonian "creation" is of comparatively recent date, for, according to Professor Sayce's revised edition of George Smith's translation, "It is evident that in its present form it was probably composed in the reign of Assurbanipal, B. C. 670. It breathes throughout the spirit of a later age; its language and style show no trace of an Assyrian original; and the colophon at the end implies by its silence that it was not a copy of an older document."—Page 56.

But, admitting that the Chaldean account is sufficiently ancient, the opposing fact remains that the Hebrews, instead of being drawn to the religious belief of their conquerors, became bitterly opposed to it and to every form of polytheism. And besides, they were a proud and exclusive race. They looked down with contempt on all the rest of mankind. It seems

impossible that they not only adopted the story of creation from those whose persons, religious beliefs, and ceremonies they hated, and incorporated it into their own sacred books, but even gave it the place of honor. It seems equally incredible that Assyrian priests, the most exclusive of men, were willing to impart their sacred writings to those who scouted them and their gods. The improbability of their bestowing such a gift is exceeded only by the improbability of its being accepted.

To this, however, it may be replied that if the Hebrews got the account the improbability is of no consequence. We are left, therefore, to an examination of the cosmogonies. In them we shall find the means of answering the question. If there prove to be agreements between them, the probability that one was derived from the other, or both from some older document, will be proportioned to the number and character of the particulars in which they agree. If these are but few, and if they are such as would of necessity be found in every cosmogony—if, for example, both accounts speak of the heavens, the earth, and sea; of cattle and beasts; of sun, moon, stars, and the like—this should have no weight in determining whether the one was derived from the other, because, in order to be a cosmogony at all, some or all of these things must be mentioned. Much more is necessary. It must be shown that the teachings of the two are essentially

alike. There may be additions and variations, but down under it all there must be substantial agreement. It goes without saying that, if there be flat contradiction in the fundamental ideas, not in one or two particulars only but in many, the Hebrew account cannot have been derived from the Chaldean.

Three Chaldean cosmogonies are known. The most famous is that styled by Mr. George Smith "The Babylonian Legend of Creation;" the second was found in what is called "The Tablet of Cutha;" and the third is the story told by Berosus. The first is the only one referred to in connection with the story in Genesis, probably because it is comparatively free from absurdities and monstrosities. Mr. Smith published his translation in 1875. In 1880 Professor Sayce published a new edition of Mr. Smith's book, "thoroughly revised and corrected." The changes introduced by Professor Sayce are very considerable. Later yet, Lenormant, in his *Beginnings of History*, has given a more readable version, but one which differs little from that of Professor Sayce.

Since the claim that the first chapter of Genesis was derived from the Chaldeans is based upon Mr. Smith's version I shall give that in full, adding, however, in notes or otherwise, the other versions where the difference is important enough to warrant it. In fact, it is of little consequence which translation is used.

1. When above the heavens were not raised,*
2. And below on the earth not a plant had grown,†
3. The abyss, also, had not broken open their (sic) boundaries, ‡
4. The chaos (or water) Tiamat (the sea) was the mother of them all.
5. At the beginning those waters were ordained ; §
6. But not a tree had grown, not a flower had unfolded. ‖
7. When the gods had not sprung up, any one of them ; ¶
8. Not a plant had grown, and order did not exist.**
9. Then were made also the great gods.
10. The gods Lakhamu and
11. Lakhamu they caused to come . . and they grew.
12. The gods Sar and Kisar were made
13. A course of days and a long time passed . . .
14. The gods Sar and . . .

Taking Mr. Smith's version, or one of those in the notes, and putting it into plain English, it says that at the opening of the account the heavens, earth, and sea were in existence ; but that order did not exist and there were no gods. The sea was the mother of all. The great gods, a pair, were produced first and grew to maturity. Another pair, Sar and Kisar, were made next. Then a long time passed, after which the gods Anu, Bel, and Hea were born of Sar and Kisar. This is absolutely all. But Mr. Smith says,

* Sayce : Were not named.

† Sayce : Below, the earth by name was not recorded.

‡ Sayce : The boundless deep was their generator (father).

§ Sayce omits *at the beginning*, and changes the rest to "their waters were gathered together in one place."

‖ Sayce says : The flowering reed was not gathered ; the marsh plant was not grown. Lenormant renders the same line by, No flock of animals was as yet collected.

¶ Sayce : Had not been produced.

** Sayce : By name they had not been called.

and so does Professor Sayce, "This corresponds with the first two verses of Genesis!" Corresponds how? In Genesis we read: "In the beginning God created the heaven and the earth." The tablet says nothing like that.

We read in Genesis that the earth was without form and void. In the myth we are told that before the gods were made order did not exist. At first this may seem to be the same as the "without form* and void" of Genesis; but modern science has taught us that these words describe a condition which actually existed while our earth was an unsegregated part of the great nebulous mass, and that there never was a time when order did not exist. Matter has always been obedient to law, whether in nebula, sun, or planet. Genesis knows nothing of a chaos. Genesis says, after the heaven and earth were created darkness covered the face of the deep, and that the Spirit of God moved upon the face of the waters. The myth says the great gods were not yet made. The water was the mother of them all. In Genesis we read: "And God said, Let there be light: and there was light." In the myth we read nothing like this; so far as the tablets are concerned light always existed.

In these few verses of our Genesis there are five distinct propositions, and not one of them parallel to any thing in the myth; and only one has the slight-

* Any of the various meanings of *tohu* will answer here.

est resemblance. Instead of similarity there is profoundest difference. According to the Hebrew account, God preceded all things, and he created heaven, earth, and sea. The tablet says, the heaven, earth, and sea were first; and at that time "the great gods had not been produced, any one of them."

The Hebrew account knows but one God; the Chaldean has many gods. The one declares that God made the universe; the other, that the universe made the gods. In the one, the beginning is that point in the existence of God when the universe began to be; in the other, it is the point in the existence of the universe when the gods began to be. It is impossible to conceive of two accounts more flatly contradictory. Unfortunately, the second, third, and fourth tablets have not been found. There is, however, a fragment which, it is thought, may belong here. I give Mr. Smith's version:

1. When (thou didst make) the foundation of the ground (or caverns, according to Sayce) of rock.
2. The foundation of the ground (caverns, Sayce) thou didst call
3. Thou didst beautify the heavens (the heavens were named, Sayce),
4. To the face of the heaven . . .
5. Thou didst give . . .

This tablet is so incomplete that it scarcely calls for remark. It contains but little, and that little illustrates the character of all the tablets. So far as what they say is true it is nothing more than every intel-

ligent man of that day already knew. The foundations of the caverns are indeed of rock, and the heavens are beautiful; but this adds no new idea. Every Chaldean knew that as well as the writer of the inscription. But in Genesis, in the third period, to which it is said this tablet corresponds, there is set forth in no Delphian utterance the important fact, only of late discovered by geologists, that the waters once covered the present dry land.

The next tablet is the best preserved of all. There are many variations in the translations. These are important as showing the tentative character of the rendering, but are of no special interest so far as the question of the origin of the Mosaic account is concerned.

Mr. Smith's Version.	Professor Sayce's Version.
It was delightful all that was established by the great gods.	1 (Ann) made suitable the mansions of the (seven) great gods.
He * arranged the stars and caused their appearance in (figures) of animals, to establish the year through observing their constellations.	2 The stars he placed in them, the Inmasi † he fixed.
	3 He arranged the year according to the bonnds that he defined.
He arranged twelve months of stars in three rows,	4 For each of the twelve months, three stars he fixed,
from the day when the year commences to its close.	5 from the day when the year issues forth to its close.
He marked the position of the planets to shiue in their courses,	6 He established the mansion of the god Nibiru, that they might know their laws (or bounds),

* Probably Ann.

† A constellation.

that they may not injure nor trouble any one.
He fixed the position of the gods Bel and Hea with him.

And he opened the great gates which were shrouded in darkness,

whose fastenings were strong on the right hand and on the left.
In the mass he made a boiling.

He made the god Uru (the moon) to rise out of it.

The night he overshadowed, to fix it also for the light of the night until the shining of the day;
that the month might not be broken, and that it might be regular in its amount.
At the beginning of the month, at the rising of the night,

its horns break through to shine in the heavens.

On the seventh day it begins to swell to a circle,
and stretches farther toward the dawn.
When the god Shamas (the sun) in the horizon of heaven in the east . . .
. . . formed beautifully.

7 that they might not err or deflect at all.
8 The mansion of Bel and Hea he established alone with himself.
9 He opened also perfectly the great gates in the sides of the world;
10 the bolts he strengthened on the left hand and on the right.
11 In its center also, he made a staircase.
12 The moon-god he caused to beautify the thick night, and he fixed for it the seasons of its nocturnal phases which determine the days.
13 He appointed him also to hinder (or balance) the night that the day may be known.
14 (Saying:) Every month without break, observe thy circle.

15 At the beginning of the month also, when the night is at its height,
16 (with) the horns thou announcest that the heaven may be known.
17 On the seventh day (thy) circle (begins to) fill,
18 but the half on the right will remain open in darkness.
19 At that time the sun (will be) on the horizon of heaven at thy rising.
20 (Thy form) determine, and make a (circle?)
21 (From hence) return (and) approach the path of the sun.

22 (Then) will the darkness return; the sun will change.
23 ...seek its road...
24 (Rise and) set, and judge judgment.
...the gods on his hearing.

This tablet, according to Mr. Smith, Lenormant, and Assyriologists generally, parallels the fourth of the creative periods of Genesis. But on comparison it will be seen that the resemblance is confined to the one fact that both speak of the sun, moon, and stars. As to all else the difference is radical. The tablet in Mr. Smith's version opens with the statement that all that the gods had established was delightful. This epithet—it is used also in the seventh tablet—corresponds, in Mr. Smith's opinion, to "good" in the story of Genesis. "Good," when applied to things without moral qualities, has but one signification, namely, fitness for their proper use or completeness. But delightful has no such meaning. It is only a synonym for "pleasing;" and when applied, as in the seventh tablet, to monsters, is simply burlesque. Professor Sayce substitutes "suitable," and Lenormant says "excellent." Both of these improve the sense; but either takes from the tablet what has been claimed as a proof that the Hebrews took their account from this source. But the difference here between Genesis and the tablet is more profound than a matter of words. In the former the Creator is repre-

sented as surveying his work and pronouncing it good. In the tablets there is no creator, but only an arranger, or arrangers, of what already existed. And it is not they who pronounce the mansions of the gods and the monsters "pleasing," or "suitable," or "excellent," whatever the correct rendering may be, but it is the writer of the story.

Even in the order of its statements the tablet is antipodal to Genesis. The one speaks of the stars first, then of the moon, and last of the sun. The other reverses this, and tells of the sun and moon, and then of the stars. In Genesis we read that God made them all. In the myth they are eternal. The creation of the universe—a beginning to the "everlasting hills"—was an idea to which the writer of the tablets had not risen. In his belief, Anu merely arranged the stars and caused the already existent moon to come from its place in the center of the earth, while the sun was in no way affected by him or any of the other gods. The myth says that Anu established the year through observing constellations of the stars. In Genesis the stars have no part to perform for our earth. It is the "great lights" that are to be for signs and for seasons, for days and years. In the tablet we read: "He marked the position of the planets in their courses, that they may not injure or trouble any one." How thoroughly this is saturated with the astrological notion then and

for centuries later so prevalent, that the stars exert an influence over men for good or for evil! There is nothing like this in Genesis.

Nearly all the rest of the tablet refers to the moon and its duties. It is to beautify the night and to make the month. To the moon the greatest prominence is given by the writer of the tablet, for to the Chaldeans the month was not only the most natural division of time, next to days, but, from its connection with religious ceremonies, the most important. Nothing, therefore, was more natural, and every way fitting, than that, in a cosmogony manufactured to meet the needs of their religion and their science, the month should occupy the most prominent place; and so it does in the Chaldean story; but in the Genesis account it is not even named. It is incomprehensible that a Hebrew, to whom the month was of as great religious importance as to the Chaldeans, should have copied their account and omitted all about that measure of time. What has been said about the character of the physical statements in the previous tablets applies with equal force to this. So far as they concern what all can see they are commonplace platitudes. As to all else, they are absurd fables.

In the first few lines there is the setting forth of the beginning of an astronomy, or rather an astrology, which had noted the year, divided the stars into constellations, and traced the paths of the planets. This

is of value as evidence that men had begun to study the heavens and to record the results of their observations, but has nothing to do with any thing in the first chapter of Genesis.

The tablet also tells us of the moon, that "at the beginning of the month, at the rising of the night, its horns break through to shine in the heavens. On the seventh day it begins to swell to a circle, and stretches farther toward the dawn." This is Mr. Smith's version. Professor Sayce's is almost unintelligible. I need not say this, too, has no counterpart in Genesis.

Unfortunately, the rest of the tablet is so defaced that little can be made of it. Enough can be read in Mr. Smith's version to show that it tells something about the sun-god. But according to Professor Sayce it is doubtful whether any thing was intended to be said about the sun, except as to its position relative to the moon. Indeed, the Babylonians honored the moon more than the sun, even making the sun-god the child of the moon-god. It was natural, therefore, to say less about it.

The sixth tablet has not been found.

The seventh tablet. "This," Professor Sayce says, "is probably represented by a fragment found by Mr. Smith in one of the trenches at Kouyunjik." He translates it as follows. The differences between this and Mr. Smith's and Lenormant's versions are unimportant.

At that time the gods in their assembly created...
They made suitable (or pleasing or excellent) the strong monsters...
They caused to come living creatures...
Cattle of the field, beasts of the field, and creeping things of the field...
They fixed for the living creatures...
...cattle and creeping things of the city they fixed...
...the assembly of the creeping things, the whole which were created...
...which in the assembly of my family...
...and the god Nin-si-ku (the lord of the noble face) joined the two together...
...to the assembly of the creeping things I gave life...
...the seed of Lakhamu I destroyed...

In this fragment is to be seen a slight verbal resemblance to one of the statements in Genesis. The gods, the myth says, made "cattle, beasts, and creeping things;" and Genesis says, God made "beasts, cattle, and creeping things." But if the authors of these two accounts were to speak of land animals at all it is difficult to see how they could avoid that much of agreement. The latter part of the tablet is so badly mutilated, and, in its present condition, so nearly meaningless, that it calls for no remark.

There is an important difference which runs through the two accounts to which I have already alluded. It shows how widely their respective authors differed in the manner of thinking and speaking, the one of his God, the other of his gods. In Genesis the Deity is represented as announcing in advance his work in successive fiats—"God said, let there be" precedes

each creative act; and when the fiat has been obeyed God surveys his work and pronounces it "good." But all through these myths the gods are dumb. As blind forces they do certain things; but they utter no fiat, announce no purpose, speak no approval.

These are all the tablets that, with any great probability, can be said to belong to this series. There is, however, a more doubtful fragment which Mr. Smith thinks belongs here. He gives it, however, under reserve. Professor Sayce says: "It is more than doubtful whether it has any thing to do with the creation tablets. It seems rather to be a local legend relating to Assur, the old capital of Assyria, and possibly recording the legend of its foundation. Bit-sarra (the place spoken of in the inscription) or E-sarra, 'the temple of the legions,' was dedicated to Ninip." *

I copy the fragment here that nothing of possible value may be omitted. I give Professor Sayce's version. Lenormant says he knows nothing of it, and merely quotes Mr. Smith's rendering:

The god Khir...Si...
At that time to the god...
So be it, I concealed thee...
From the day that thou...
Angry thou didst speak...
The god Assur opened his mouth and spake to the god...
Above the deep, the seat of...
In front of Bit-sarra, which I have made...

* *Chaldean Genesis*, revised edition, p. 63.

Below the place I strengthen...
Let there be made also Bit-Lusu, the seat...
Within it his stronghold may he build and...
At that time from the deep he raised...
The place...lifted up I made...
Above...heaven...
The place...lifted up thou didst make.
...the city of Assur the temples of the great gods . . . his father Anu...
The god...thee and over all that thy hand has made
...thee, having over the earth which thy hand has made
...having Assur which thou hast called its name.

Whatever this may be, it has no connection with the first chapter of Genesis.

Mr. Smith styles this account "The Story of Creation in Days," and others have adopted the name. It is difficult to see the propriety of so doing. There is no allusion in it to days in connection with creative periods. There is nothing like the Hebrew order, first day, second day, third day, and so on. Indeed, the word does not occur in any sense, except once in the first tablet, where it says, when giving the origin of the gods, "Sar and Kisar were made next. The days were long, a long (time passed), and then the gods Anu, Bel, and Hea were born of Sar and Kisar." Rev. Mr. Cheyne says, in his article in the *Encyclopædia Britannica*, that the day clauses in Genesis are interpolations, but of this he offers no proof. It seems only a random assertion to get rid of a difficulty in the way of a favorite theory.

To sum up the whole matter. The story in Gene-

sis and that on the tablets have the following points in common: 1. The subjects treated of, namely, sun, moon, stars, earth, and animals of the land. 2. Cattle and beasts came into being by the act of a god. These points of agreement are so few and of such a character that it would be impossible to write a cosmogony without them. Hence they prove nothing. The differences between the two accounts are many and vital. The Chaldean is almost wholly occupied with the genealogy and mythical deeds of the gods; indeed, it seems intended for a theogony rather than a cosmogony. In the Hebrew this is all absent. It opens with God in existence, and the heavens and earth not in existence. The Chaldean is just the opposite. It opens with heavens and earth in existence, and the gods are not yet made. The Hebrew represents God as the Creator of the universe. The Chaldean represents the sea, a part of the universe, as producing the gods, and the gods not as creators, but merely as givers of order and law to a universe in which "order did not exist." The Hebrew represents God as announcing his purposes in a series of fiats. The Chaldean gods announce nothing. The Hebrew represents God as himself seeing the things done and pronouncing them "good." In the Chaldean the gods utter no verdict of approval; where it does occur it is the writer, and not the deities, who pronounces the mansions "suitable." The Chaldean tells of a

time when order did not exist; the Hebrew tells of no such time, but every-where represents matter, like a disciplined cohort, moving to the word of its commander. The Hebrew tells us of a first day and night. The Chaldean regards the series of day and night as eternal. The Hebrew is divided into stages of progress separated by numbered days. The Chaldean knows nothing of numbered days. Genesis makes the year to depend on the two great lights. The Chaldean makes it depend wholly upon the stars. In Genesis the stars are barely mentioned. In the Chaldean account they occupy the most prominent position. In Genesis, chapters one and two, the month is not so much as named. In the myth the month is the chief measure of time.

These differences, I submit, are not only profoundly important, but are of such a character as to forbid the belief that they are the result of the editing, by some skillful monotheistic *rédacteur*, of the story of the tablets. There is, in the story which we have, nothing from the first tablet. The second fragment, which tells the reader that the foundation of the caverns is made of rock, has left no trace of itself in the Hebrew account. The third recovered tablet tells of a god who made stairs and bolted gates, or made a boiling from which the moon arose. The ancient *rédacteur* has not incorporated any of this, nor, indeed, any part of what is on the tablet, into the story which we have in our Bible.

In the next recovered fragment there seems to be a statement that the gods made cattle, beasts, and creeping things. A similar statement is found in our Genesis.

And this is all.

Of the three requirements to prove the Chaldean inscription the source of the Hebrew story of creation, the first, priority, is very doubtful; the second, identity of subject, although questionable—for the account on the tablets seems to be intended for a theogony instead of a cosmogony—may be admitted under protest; while the third, identity of statement, order, and thought, is wholly lacking.

THIS ACCOUNT NOT THE WORK OF SOME ANCIENT SCIENTIST.

THERE has lately fallen under my observation a little book intended to show the absurdity of the Mosaic account of creation when viewed from a scientific stand-point. It says: "Present it to us as the speculation of some early philosopher who strives with his limited knowledge to conceive how the universe came into its present condition, and we can, of course, accept it as such and treat it accordingly. Taking the views that were held by the people generally at the time this story was written, we can see how the writer came to make it as we find it. The earth was then regarded as the most important body in the universe; the stars were shining points, and the sun and moon about as large as they look to be; and the whole account reflects this view."

The reader will please note this "view." Without doubt it did really prevail among the most advanced minds in the time of Moses, and all men, however they may regard the account in Genesis, believe that it did. But when it is seen that this narrative is in accordance with the most advanced science of the present day there will be a change of front on the part of those

who can believe any thing but a revelation. We shall then be told that the Mosaic account of creation is only the embodiment of a more ancient science. The difficulties which arise from a total lack of historical evidence in favor of such an hypothesis, as well as from the abundant evidence to the contrary, will be avoided by claiming that this knowledge was the remains of a culture which had become so lost at the time when Moses wrote that he himself did not comprehend it, but took the account bodily from some manuscript handed down from an inconceivably more remote period. It is true that such an answer involves the objectors in the difficult task of harmonizing with it all that is said to have been proved about man's progress from the paleolithic age and the cave life; but this is an obstacle which a resolute disbeliever in a revelation can easily get over by saying that very little is known of the early man, and that perhaps after all he has been underrated. It will be amusing to see how certain writers will eat their own words. For they must admit that ability to relate so many actual occurrences in the world's history, to place them in their proper order, and to divide the story into six parts, each corresponding to a natural and philosophical stage of progress in the history of the world, implies on the part of the author of the account—we dare not say how much knowledge of astronomy and geology, the relation of light to motion, and the revelations of the

spectroscope. To maintain that some ancient people, of whom not the slightest trace remains, attained such height of knowledge, we must assume that in the hitherto unheard-of past there was reached a progress in science such as has only lately been gained by moderns.

Such progress was impossible without modern methods and appliances. There was needed a system of notation and numeration equivalent to that which we enjoy, together with a calculus which anticipated Newton's, and logarithms thousands of years before Napier's, as well as telescopes and spectroscopes and instruments of precision. There are indications, also, of a knowledge of geography, botany, and geology. All this could be gained only by the co-operation of many individuals, not in one or two localities, but over the world. Hence this ancient and most remarkable people must have had the means of communication with other peoples. The necessary observations could not have been made in a single life-time, and therefore they needed to be preserved and in some way made accessible to all who desired to labor upon them and deduce their proper teachings; for in no other way could any great amount of information be got out of them. Hence the art of printing, or some equivalent, was essential. In short, the power to write this chapter required on the part of its author our present science and all that that implies.

But all this may be claimed for that ancient civilization, since, according to our objector, no one knows how long man has existed, and therefore no one can say how many civilizations have culminated and perished. Such arguments, being unhampered by facts, may assume a thousand forms. Nor will it be deemed an answer to remind the objector that his present position is in flat contradiction to his former teachings. The inconsistency will neither silence nor abash him. His arguments can be effectually met only by the internal evidence of the account itself.

A careful analysis will show that it could not have been written by one who obtained his knowledge as scientists obtain theirs. They must ascend by generalization, rising from particulars to universals, reaching step by step from the known to the unknown. Hence, by the very nature and requirement of making progress at all, they acquire the habit of looking only to physical causes, and through phenomena to some general law that binds them into forms and groups which a finite mind can remember and handle. Therefore one of their greatest needs is the mnemotechny of an exact and copious terminology, the lack of which would render progress, beyond moderate limits, impossible, for the mind would break down under the burden of an infinite number of unclassified facts.

In this account there are none of those peculiarities

which mark the scientific mind; no generalizations; no laws; no underlying causes; no deductions; no special terminology. The writer passes at a step beyond and through all laws to the Intelligent Cause whose personality so permeates every verse as to render its elimination impossible. His language is as opposite to technical as can be conceived; but while it is phenomenal it is more than the phenomenal description of a mere eye-witness. It bears in itself evidence of being the work of One who exhaustively understood the import and the order of all phenomena, and from an infinite abundance selected those suited to his purpose. These he has recorded in accurate language, leaving the reader to derive from them all that his capabilities permit. He says nothing of the nebular hypothesis, but he says that once the earth was without form and void; nothing of the correlation of forces, and nothing of their relation to light, but he places the beginning of motion between the primordial darkness and the first light; nothing of the earth's long progress through self-luminous periods to its present condition, a solid opaque planet, but he names the fact that marks the close of the one condition and the beginning of the other, a fact that fits in nowhere else. In short, every word and every phrase indicates a knowledge not cramped within the narrow limits of scientific formulas, but as free and suggestive as Nature herself.

To believe that such a statement as this is the fragment of some ancient work evolved, as are now astronomy, geology, and other sciences, by the slow collection and study of facts, does violence to the laws of our mental being.

THE END.